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**A STUDY OF FLORA OF BHOPAL TO PRODUCE
RESOURCE MATERIAL FOR BIOLOGY TEACHERS OF
MADHYA PRADESH**

**REPORT
ERIC (NCERT) PROJECT
1988**

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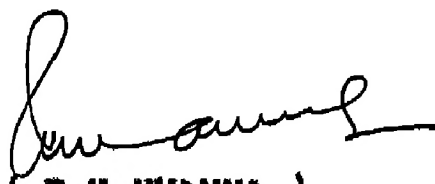
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Bhopal
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CHAPTER - I

INTRODUCTION

Extensive researches have brought to the light, immense knowledge about the floristic patterns and distribution of various groups of plants in many parts of our country. However, still there are vast areas which are unexplored and therefore, we do not have a clear understanding of plants of these areas. Madhya Pradesh is one such state, where taxonomical studies have not received the required attention, though Angiosperms are abundant in this region. Ofcourse, a few references dealing with the presence of some plants in a few areas are available. But so far, a systematic study has not been made in order to get a clearer picture of the composition of Flora of this region except the commendable work done by Oenachan in 1977.

For a Biology teacher, the knowledge of the floristic composition is essential prerequisite for organising theory and practical classes. This becomes more important as the work in the laboratories are neglected partly due to the lack of knowledge of the local flora. A Biology Teacher not knowing the names of plants growing locally will be unable to teach about them. The National Policy on Education 1986, expects the teachers to take up the role of a facilitator of learning. This means that the knowledge of the teacher in plant taxonomy must be more as compared to his present status. This necessitates the workers in taxonomic field to prepare a flora of the region with a couple of

illustrations. It has been recommended by several workers that the Flora of big cities and their environs be worked out. Human interferences have also been responsible for changes in floristic composition of most of the urban settlements, thereby enhancing the need.

Madhya Pradesh, the largest state of India, is a land locked state surrounded by the states of Uttar-Pradesh, Bihar, Orissa, Andhra Pradesh, Maharashtra, Gujarat and Rajasthan. It lies between parallels of latitude 17° - $48'$ and 26° - $52'$ North and the Meridians of longitude 74° - $2'$ and 84° - $24'$ East. The forest coverage of the state is 2,74659 sq.km. The forests of the state are of diverse nature. The major part of Madhya Pradesh is unexplored or under explored. Bhopal is one of the unexplored areas except that Oomachan 1977 has published a flora of Bhopal. None else has published any thing since then.

On Oct.2,1972, a new district of Bhopal was created covering an area of 2763.4 sq.km. Bhopal is a fast developing city with the development of several gardens. Rapid urbanisation has changed the floristic composition of the town, consequently, it is no more possible to establish whether the plant is exotic or native.

Earlier workers have paid attention towards enumeration identification and classification. Several plants are cited as examples in the text books. A teacher, not adequately trained in taxonomy often avoids collecting and using them in the classes. Some of the teachers, try to

identify them with the help of floras and books on taxonomy. Specialization and deep understanding of plant taxonomy is a prerequisite to consult floras. After a few futile efforts the teacher becomes disgusted and finally joins the majority of teachers to teach without the plants.

One of the easiest method of plant identification is to match the actual plant specimen with suitably drawn sketches. Such materials are not available readily. The text books are not local specifics. Therefore, many plants cited in the books are not locally available. In order to improve instructions in class and laboratory, the teacher must find plants which are locally available as substitutes to the plants that are mentioned in the text.

Keeping the difficulties of a Biology teacher in view, the present study was undertaken to produce an illustrated resource book so as to enable them to identify and use the plants effectively, while teaching. In this resource book, more than 120 plants have been identified and described along with diagrams. Also, given, is a list of plants with common names, which are often cited in different text books. Since it is the first attempt, there are possibilities of errors and mistakes, which the learned teachers will not mind. Suggestions for improvement are invited.

CHAPTER - II

BHOPAL AND ITS ENVIRONS

On 1st November, 1956, Bhopal was made the capital of Madhya Pradesh. There are different views about the name "Bhopal". According to one view, the city derived its name from "Bhoj Tal" the upper lake or the "Bara Talab" constructed by the Hindu Ruler Raja Bhoj. The other view attributes its name to the king, the "Bhupala". The derivation of the name is also related to "Bhoj-Pal", or Bhoja's Dam constructed by king Bhoj. Bhopal is the best example of man made squatter, thriving in most beautiful natural surroundings provided by low hills and expansive lakes.

Geography, Vegetational Features and Climate : -

Bhopal is a city of moderate climate with less fluctuations of temperatures as compared to other parts of the state. It is located on 23°-16' North latitude and 77°-25' East longitude. The altitude is 503 M.S. level. It has two main lakes, the upper lake and the lower lake. The former has an area of 4,827 sq.km and the later of 3,218 sq.km. There are a couple of smaller water bodies such as Jama tank, Motia tank, Middle tank, Banseer tank etc. at and around Bhopal. Larger water bodies, specially the upper lake is the source of drinking water while the lower lake is being utilized for recreational purposes.

The smaller water bodies are used for the cultivation of Trapa bispinosa and Nelumbo nucifera etc. The two larger lakes divide the city into old city (Northern part) and New City (Southern part). The old Bhopal includes the main Railway station, Bus stand area and new Bhopal includes T.T.Nagar, Arera Colony, Habib Ganj and areas extending upto extreme Southern part of Bhopal.

Besides lakes, Bhopal, has several hills also. The highest hillock is situated between Habib Ganj and Misrod railway stations (687 M). Most of the hills in the urban areas are inhabited and has scanty vegetation, dominated by Lantana camara and Ipomoea fistulosa.

A small rivulet called Kolan's nala brings water in to the upper lake while Kalasot is the main outlet of it. The level of water in the lake is regulated by a small dam constructed at Bhadbhada.

Bhopal has black-cotton soil which is fertile and is under cultivation of a number of crops such as wheat, rice, jawar, gram, linseed cotton maize, ground nut, pulses and sugarcane etc. The hills are covered with plants like Diospyros melanoxylon, Tectona grandis, Terminalia crenulata, Madhuka indica, Eutea monosperma, Dalbergia latifolia, Lagerstromia parviflora, Zizyphus mauritiana etc. It is typically a tropical dry deciduous forest type. There are several grasslands in the area mainly dominated by Dichanthium, Themeda, Saccharum and Vetiveria. In much

disturbed areas, near human settlements plants like Xanthium strumarium, lantana indica, Ipomoea fistulosa, Echinops echinatis, Calotropis procera, Argemone mexicana, Datura metel and a good number of composites, legumes and grasses are found.

The lakes have rich flora of Angiosperms, showing seasonal variations of its communities. The dominant species are Nelumbo, Eichhornia, Jussiaea, etc. from Aug to October. From October to December dominant forms are Hygrophila, Hydrilla, utricularia, Nymphaea, Trapa, Ipomoea etc. During winter season i.e. January to March, species of Hydrilla, Vallisneria, spirodela, Potamogeton, Najas, Ceratophyllum, Myriophyllum, Eichhornia, Jussiaea and Nelumbo appear and remain dominant and most of them remain as such during the summer months as well.

Climatically, Bhopal is like a tropical area. It is relatively moderate and dry throughout the year except July to September. Actual cold season is from December to February and Summer from March to June. The average rainfall is 919 mm. Nearly 90% of rain falls during July to September. The highest temperature is recorded during May and June when it is 45°C. January is the coldest month in which the lowest temperature drops to 3°C often. The Relative Humidity varies considerably. In the rainy season it is near 91% and in summer it falls to 20% or less.

Bhopal stands on red sand stone strata on the Malwa Plateau with various hillocks in and around the city. The top portions of the hillocks and slopes have mostly hard red soil mixed with boulders and black cotton soil at some places. The pure black cotton soil is however observed in various depths ranging from 1 to 2.5 meters on the north eastern and south eastern part of the city. The railway line running from North to South is the dividing line between the two types of soil. On the west^{of} the line is found Black cotton soil and red laterite soil while on the east is found the black cotton soil in various depths.

CHAPTER III

List of some useful and exemplar plants useful to Biology Teachers

DICOTYLEDONES

Family - Ranunculaceae

<u>Botanical name</u>	<u>Common Name</u>
1. <u>Delphinium ajacis</u> L.	The Larkspur
2. <u>Nigella arvensis</u> L.	<u>Kala Jeera</u>

Family - Magnoliaceae

1. <u>Michelia champaka</u> L.	Champak.
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Family - Annonaceae

1. <u>Annona squamosa</u> L.	The Custard apple, <u>Sherafa</u>
2. <u>Polyspathis longifolia</u> Thw.	False Ashok.

Family - Menispermaceae

1. <u>Tinospora cordifolia</u> (Willd.) Miers -	<u>Gulal</u>
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Family - ^{ca}Nymphaeaceae

1. <u>Nymphaea stellata</u> Willd. -	<u>Chhota kamal</u>
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Family - Nelumbonaceae

1. <u>Nelumbo nucifera</u> Gaertn.	<u>Kamal</u>
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Family - Papaveraceae

1. <u>Argemone mexicana</u> L.	Prickly Poppy, <u>Peelikatari</u> .
2. <u>Papaver rhoeas</u> L. Var. <u>latifolia</u>	Garden poppy <u>Labbata</u>
3. <u>Papaver somniferum</u> L.	Opium, Poppy <u>Pasta, Afim</u> .

Family - Fumariaceae

1. <u>Fumaria indica</u> (Hauk.)	<u>Pitpatta</u>
Pugsley.	

Family - Brassicaceae (Cruciferae).

1. Brassica campestris L. Var. Sarsen Prain. Mustard, Sarsen.
2. B. nigra Koch. Black Mustard, Kali Rai.
3. B. oleracea L. Var. botrytis L. Cauliflower, Phul gebhi.
4. B. oleracea L. var capitata L. Cabbage, Bandh Gebhi
5. B. Rapa L. Turnip, Shaljam.
6. Iberis amara L. Candytuft
7. Raphanus sativus L. Radish, Muli.

Family - Cleomaceae

1. Cleome gynandra L. Hul-hul

2. C. viscosa L.

Family - Violaceae

1. Viola tricolor L. The Pansy, hort's case.

- Family- Caryophyllaceae

1. Dianthus caryophyllus L. The carnation

2. Silene aeneoides

Family - Portulacaceae

1. Portulaca grandiflora Hook. The sun plant, Lunia

2. P. oleracea L. Kulpha

3. P. quadrifida L.

Family - Malvaceae

1. Abelmoschus esculentus (L.) Moench, Meth. Ladh's Finger, Shindi.

2. Abutilon indicum (L.) Sw. Kanghi

3. Althaea rosea Cav. Holly-hock.

4. Gossypium herbaceum L. Cotton plant, Kapas

5. G. hirsutum L. Kapas

6. Hibiscus-rosa-sinensis L China rose, shoe flower
Gurhal
7. Malvastrum coromandelianum (L.) Garoka.
8. Sida cordifolia L.
9. Thespesia populnea (L.) Soland, The Tulip tree.

Family - Bombacaceae

1. Bombax gaiba L. Syn. B. malabaricum D.C.
The silk cotton tree.
Semal.

Family - Tiliaceae

1. Corchorus trilecularis L.
2. C. capsularis L. Jute
3. C. aestuans L.

Family - Linaceae

1. Linum usitatissimum L. Flax, Linseed, Alai.

Family - Oxalidaceae

1. Oxalis corniculata L. Indian sorrel, Khatmithi
2. O. latifolia HB & K. Khatmithi

Family - Tropaeolaceae

1. Tropeolum majus L.

Family - Balsaminaceae.

1. Impatiens balsamina L. Balsam, Gulmehdi.

Family - Rutaceae.

1. Aegle marmelos L. The wood apple, Bel
2. Citrus aurantium L Orange, Santara
3. C. maxima (Burm.) Merrill Pungle, Chaketara
4. C. limon (L.) Burm. Lemon, Nimbu
5. Murraya keenigii (L.) Spreng. Maethanaam

Family - Meliaceae

1. Azadirachta indica A Juss. Neem
2. Melia azadirach L. Bakain

Family - Rhamaceae

1. Zizyphus mauritiana Lam. Jujube, Ber
2. Z. nummularia (Burm. F.) Wt. and Arn. Kanta Ber
3. Z. xylopyra Willd. Kahber

Family - Vitidaceae

1. Vitis vinifera L. Grape wine, Angur

Family Moringaceae

1. Moringa oleifera Lam Drumstick, Sahjan

Family Papilionaceae

1. Aeschynomene indica L.
2. Abrus precatorius L. Ratti
3. Alysicarpus hupleurifolius D.C.
4. Arachis hypogaea L. Ground nut, Mungphali
5. Butea monosperma (Lam.) Taub. The flame of forest, Dhak.
6. Cajanus cajan (L.) Millsp. Pigeon Pea, Tuar Arhar
7. Cicer arietinum L. Gram, Chana
8. Crotalaria juncea L. The sun hemp, Sanai
9. Dalbergia sissoo Roxb. Shesham
10. Delichos lablab L. Kidney bean, Sam
11. Glycine max (L.) Merr. Soyabean
12. Lathyrus odoratus L. Sweet Pea, Phul matar
13. Malilotus indica All.
14. Phaseolus mungo L. Var coxburghii - Prain
Black gram, Urad
15. P. radiatus L. Green gram, Moenga

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| 16. <u>Pisum sativum</u> L. | Garden Pea, <u>Bara Matar</u> |
| 17. <u>P. arvense</u> L. | Field pea <u>Chhota Matar</u> |
| 18. <u>Lesbania grandiflora</u> Pers. | Agastya |
| 19. <u>Tephrosia purpurea</u> (L.) Pers. | Wild Indigo. |
| 20. <u>Trigonella foenum-graceum</u> L. | Fenugreek; <u>Methi</u> . |
| 21. <u>Vicia sativa</u> L. | |
| 22. <u>Zornia gibbosa</u> span. | |

Family Cassalpiniaceae

- | | |
|---------------------------------------|---|
| 1. <u>Bauhinia purpurea</u> L. | <u>Kachnar</u> |
| 2. <u>B. variegata</u> L. | <u>Kachnar</u> |
| 3. <u>Cassia fistula</u> L. | The Indian Laburnum
<u>Amaltas</u> |
| 4. <u>C. obtusifolia</u> L. | <u>Chakrad</u> |
| 5. <u>Delonix regia</u> (Boj.) Rafin. | Gold Mohar, <u>Gulmohar</u> |
| 6. <u>Parkinsonia aculeata</u> L. | Jerusalem Thorn
<u>Vilavati</u> <u>Babul</u> |
| 7. <u>Peinciana pulcherrima</u> L. | Peacock flower. |
| 8. <u>Saraca indica</u> L. | The Ashok tree |
| 9. <u>Tamarindus indica</u> L. | The Tamarian tree <u>Imli</u> . |

Family Mimosaceae

- | | |
|---|--|
| 1. <u>Acacia suriculiformis</u> A.Cunn. | The Australian
Phyllode Acacia |
| 2. <u>A. catechu</u> Willd. | <u>Khair</u> or <u>Katha</u> tree |
| 3. <u>A. nilotica</u> (L.) Del. | <u>Babul</u> tree |
| 4. <u>Albizia lebbek</u> (L.) Benth. | <u>Sirish</u> |
| 5. <u>Mimosa pudica</u> L. | Sensitive plant, Touch
me not <u>Chhuimui</u> , <u>Laiwanti</u> |
| 6. <u>Pithecellobium dulce</u> (Resb.) Benth. | <u>Jungal Jalabi</u> |

Family - Crassulaceae

1. Kalanchoe pinnata (Lam.) Pers. Patharchat

Family - Rosaceae

1. Rosa indica L. The rose, Gulab

Family - Combretaceae

1. Quisqualis indica L. The Rangoon Creeper

Family - Myrtaceae

1. Callistemon lanceolatus D.C. The bottle brush tree
 2. Eucalyptus paniculata Sm.
 3. Psidium guajava L. The Guava tree, Amrud
 4. Syzgium cumini (L.) Skeels. Black plum tree, Jamun

Family - Lythraceae

1. Lagersteemia indica L.
 2. Lawsonia inermis L. The Henna plant Mehandi

Family - Caricaceae

1. Carica papaya L. The Papaw tree Papeeta

Family Cucurbitaceae

1. Citrullus vulgaris Schrad. Water Melon, Tarbui
 2. C.vulgaris Schrad. var. fistulosus Tinda
 3. Cucumis mele L. The Musk Melon. Kharbooja
 4. C.mele L.var.utilissimus Kakri
 5. C.sativus L. Khira
 6. Cucurbita maxima Duch. & Lam. Red gourd Kaddu
 7. C.papa L. Pumpkin, Vilayati Kaddu
 8. Lagenaria vulgaris Ser. Bottle gourd Leuki
 9. Luffa cylindrica (L) M.Reem. Ghia Tori
 10. L.acutangula (L) Roxb. Tori

11. Melothria maderaspatana (L.) Cogn.
12. Momordica charantia L. Bitter gourd, Karela
13. Trichosanthes anguina L. Snake gourd. Chichinda

Family Cactaceae

1. Cereus hexagonus Haw.
2. Opuntia dilloensis Haw. Prickly pear, Nagphani
3. O. elaeagnifolia Mill. Nagphani

Family - Molluginaceae

1. Mollugo pentaphylla L.

Family - Apiaceae (Umbelliferae).

1. Anthemum graveolens L. Sowa.
2. Coriandrum sativum L. Coriander, Dhania
3. Cuminum cyminum L. Cumin, Zaera
4. Daucus carota L. Carrot, Gajar
5. Foeniculum vulgare Mill Gard. Fennel, Saunf.
6. Trachyspermum ammi (L.) Sprague. Aiwain

Family - Rubiaceae

1. Hamelia patens Jacqu. Rat poison tree.
2. Ixora arborea Roxb. The torch tree.
3. Mussaenda glabrata (Hook f.) Hutch.

Family - Asteraceae, (Compositae)

1. Aster amellus L.
2. Crysanthemum indicum L. Guldavadi.
3. Cosmos bipinnatus Cav.
4. Dahlia variabilis Desf.
5. Echinops echinatus Roxb.
6. Helianthus annuus L. Sunflower, Suraimikhi

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|---------------------------------------|-----------------------|
| 7. <u>Parthenium hysterophorus</u> L. | <u>Gazarghaas</u> |
| 8. <u>Tagetes erecta</u> L. | <u>Marigold Genda</u> |
| 9. <u>Tridax procumbens</u> L. | <u>Mundi</u> |
| 10. <u>Xanthium strumarium</u> L. | <u>Gokhru</u> |
| 11. <u>Zinnia elegans</u> , Jacq. | |

Family - Sapetaceae

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|--------------------------------|--|
| 1. <u>Madhuka indica</u> Omei. | The Indian butter tree
<u>Mahua</u> |
| 2. <u>Mimusops elengi</u> L. | <u>Maulsiri</u> . |

Family - Oleaceae

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|--------------------------------------|----------------|
| 1. <u>Jasminum arborescens</u> Roxb. | <u>Chameli</u> |
| 2. <u>J. auriculatum</u> vahl. | <u>Juhi</u> |
| 3. <u>J. officinale</u> . L. | |

Family - Apocynaceae

- | | |
|--|--|
| 1. <u>Carissa carnandas</u> L. | <u>Karonda</u> |
| 2. <u>C. spinarum</u> L. | <u>Jungli Karonda</u> |
| 3. <u>Catharanthus roseus</u> (L.) G. | <u>Sada behar</u> |
| 4. <u>Nerium indicum</u> Mill. | <u>Oleander, Kaner.</u> |
| 5. <u>Thevetia peruviana</u> (Pers) Merr. | <u>Yellow oleander</u>
<u>Peela Kaner</u> |
| 6. <u>Tabernaemontana divaricata</u> (L.) R.Br | <u>Chandani</u> |

Family Asclepiadaceae

- | | |
|---------------------------------------|--------------------------|
| 1. <u>Calotropis gigantea</u> (L.) R. | <u>Safed akva, Madar</u> |
| 2. <u>C. procera</u> (Ait.) R. | <u>Madar, Akva.</u> |

Family-Polemoniaceae

- | | |
|-------------------------------|--|
| 1. <u>Phlox divaricata</u> L. | |
|-------------------------------|--|

Family - Heliotropiaceae

- | | |
|-------------------------------------|--|
| 1. <u>Heliotropium supinum</u> L. | |
| 2. <u>Trichodesma indicum</u> R.Br. | |

Family Convolvulaceae

1. Evolvulus alsinoides L.
2. Ipomoea fistulosa Mart. ex. Choisy Beshram
3. I. sairica (L.) Sweet,
4. I. aquatica Forsk.
5. I. quamoclit L.

Family - Cuscutaceae

1. Cuscuta reflexa Roxb. Amarbel.
2. C. hyalina Roth. Dodder, Amarbel

Family - Solanaceae

1. Capcium annuum L. var acuminata Fingerh. Red pepper, Mirch
2. Cestrum nocturnum L. Night queen, Raat Ki Rani
3. Datura innoxia Mill Datura
4. D. metel L Kala Datura
5. Lyopersicon esculentum Mill, Tomato, Tamatar
6. Petunia nyctaginiflora Juss.
7. Physalis minima L.
8. Solanum indicum L. Bhatkatori
9. S. melongena L. The brinjal, Bajjan
10. S. nigrum L. Makey
11. S. tuberosum L. Potato, Aloo
12. Withania somnifera

Family Scrophulariaceae

1. Antirrhinum orentium L. Snapdragon
2. Ruellia coccinea Watts.
3. R. aquatilis Schlecht & Cham.
4. Striga angustifolia (L.) Sald.

Family - Orobanchaceae

1. Orobancha aegyptica Pers.

Family - Lentibulariaceae

1. Utricularia flexuosa Vahl. Enum.
2. U. stellaris L.

Family - Bignoniaceae

1. Jacaranda mimosifolia D. Nili gulmohar
2. Tecoma stans (L.) H.B. & K.

Family Martyniaceae

1. Martynia annua L. Kauva

Family - Thunbergiaceae

1. Thunbergia erecta (Benth.) T. Anders.

Family - Acanthaceae

1. Adhatoda vasica Nees.
2. Barleria prionitis L.
3. Justicia diffusa Willd.
4. Peristrophe bicalyculata (Retz.) Nees.
5. Ruellia indica Jindal
6. Rungia repens (L.) Nees.

Family - Verbenaceae

1. Clerodendrum phleoides L.
2. C. interme (L.) Gaertn.
3. Duranta repens L.
4. Lantana camara L. var aculeata (L.) Mold.
5. Holmskioldia sanguinea Retz.
6. Teetona grandis L. Sagwan
7. Verbena officinalis L.
8. Verbena sp.

Family - Bignoniaceae

1. Tecoma stans. (L.) H B & K.

Family Labiateae

- | | |
|---|--------------------------------|
| 1. <u>Leucas aspera</u> (Willd) Spreng. | <u>Gepha</u> |
| 2. <u>Mentha spicata</u> L. | <u>Pundina</u> |
| 3. <u>Ocimum basilicum</u> L. | Sweet basil, <u>Kali Tulsi</u> |
| 4. <u>O.canum</u> Sims. | <u>Jungle Tulsi</u> |
| 5. <u>O.sanctum</u> L. | <u>Tulsi</u> |
| 6. <u>Salvia officinalis</u> L. | True sage. |

Family - Nyctaginaceae

- | | |
|---------------------------------------|-------------------------------|
| 1. <u>Boerhaavia diffusa</u> L. | <u>Punarnava</u> |
| 2. <u>Bougainvillea glabra</u> Choisy | <u>Begonbel</u> |
| 3. <u>B.spectabilis</u> Willd. | |
| 4. <u>Mirabilis jalapa</u> L. | Four O'clock, <u>Gulabhas</u> |

Family Amaranthaceae

- | | |
|----------------------------------|--------------------------|
| 1. <u>Achyranthes aspera</u> L. | |
| 2. <u>Amaranthus spinosus</u> L. | Kantevali <u>Chaulai</u> |
| 3. <u>A.tricolor</u> L. | Chauli |
| 4. <u>A.viridis</u> L. | |

Family Chenopodiaceae

- | | |
|--------------------------------|-------------------------------|
| 1. <u>Beta vulgaris</u> L. | Garden beet, <u>Chukandar</u> |
| 2. <u>Chenopodium album</u> L. | <u>Bathua</u> |

Family - Polygonaceae

1. Antigonon leptopus Hook & Arn.
2. Muhlenbeckia platyloba (Muen.) Meissn.
3. Polygonum glabrum Willd.

Family - Loranthaceae

1. Dendrophthoe falcata (L.f.) (Ettings.

Family - Euphorbiaceae

1. Acalypha indica L.
2. Embilica officinales Gaertn. Anla
3. Euphorbia pulcherrima Willd. The Poinsettia, Lal Latta
4. E. hirta L
5. E. milli Ch-des-Moulins.
6. Jatropha curcas L. Safed Rendi
7. Putranjiva roxburghii Wall Putranjiva
8. Phyllanthus sp.
9. Ricinus communis L. Caster oil plant, Rendi

Family - Ulmaceae

1. Holoptelea integrifolia (Roxb.) Planch. Banderpepadi

Family - Moraceae

1. Artocarpus heterophyllus Lamk. Jack fruit, Kathal
2. A. lekeocha Roxb. Barnhal
3. Ficus bengha lensis L Banyan tree, Bargad
4. F. repens Willd.
5. F. hispida L
6. F. lacemosa L. Goelar
7. F. religiosa L Peepal
8. Morus alba L Shaktut

Family - Casuarinaceae

1. Casuarina equisetifolia L. Vilayati Jhan

Family - Ceratophyllaceae

1. Ceratophyllum demersum L

MONOCOTYLEDONES

Family - Hydrocharitaceae

1. Hydrilla verticillata (L.F.) Royle.
2. Wallisneria spiralis L.

Family - Orchidaceae

1. Vanda roxburghii R.Br.

Family - Zingiberaceae

- | | |
|--------------------------------------|-----------------------|
| 1. <u>Curcuma amada</u> Roxb. | Mango Ginger plant |
| 2. <u>C. longa</u> L. | <u>Haldi</u> |
| 3. <u>C. nailgherrensis</u> Wight. - | -crownroot |
| 4. <u>Zingiber officinale</u> Roscoe | Ginger, <u>Adarak</u> |

Family - Cannaceae

1. Canna flaccida Salisb.
2. C. indica L.

Family Musaceae

1. Musa paradisiaca L.
- Banana, Kela

Family - Amaryllidaceae

1. Crinum sp.

Family - Agavaceae

1. Agave americana L.
2. Dracaena conicarpa Kunth.
3. Yucca gloriosa L.

Family Liliaceae

- | | |
|---|---------------------------|
| 1. <u>Allium cepa</u> L. | The onion, <u>Pyaaz</u> |
| 2. <u>A. sativum</u> L. | The garlic, <u>Lahsun</u> |
| 3. <u>Aloe barbadensis</u> Mill. Gard. | |
| 4. <u>Asparagus racemosus</u> Willd. var <u>javanicus</u> | Baker. |
| 5. <u>Asphodelus tenuifolius</u> Cav. | |
| 6. <u>Gloriosa superba</u> L. | The glory lily. |

Family - Ruscaceae

- 1.
- Ruscus aculeatus
- L.

The butcher's bro om.

Family - Smilacaceae

- 1.
- Smilax prolifera
- Roxb.

Family Protenderiaceae

- 1.
- Eichhornia crassipes
- (Marg. Solms.
- Water Hyacinth,
-
- Jalkumbhi

Family - Commelinaceae

- 1.
- Commelina forakalii
- vahl.

- 2.
- C. benghalensis
- L.

- 3.
- Rhoeo discolor
- Hance.

Family - Araceae

- 1.
- Carveta urens
- * L.

Sago Palm

- 2.
- Cocos nucifera
- L.

Coconut tree, Nariyal

- 3.
- Phoenix sylvestris
- (L.) Roxb.

Date Palm, KhajoorFamily - Araceae

- 1.
- Anerpophallus campanulatus
- (Roxb.) Bl.
- Sooran

- 2.
- Coleocasia esculenta
- (L.) Scheet.

Arvi

- 3.
- Coleocasia
- sp.

- 4.
- Pistia stratiotes
- L.

Water soldier.

Family Potamogetonaceae

- 1.
- Potamogeton indicus
- Roxb.

Family Lemnaceae

- 1.
- Lemna paucostata
- Hegelmaier

- 2.
- Spiredela polyrrhiza
- (L.) Schleid.

- 3.
- Wolffia microscopia
- Kurz.

Family - Cyperaceae

1. Carex fedia Nees.
2. Cyperus alopecuroides Rettb.
3. C. triceps (Rettb.) Endl.
4. C. rotundus L.

Family - Gramineae (Poaceae)

1. Avena sativa L. The Oats, Jai
2. Bambusa arundinacea (Retz.) Willd -
The Thorny Bamboo, Kanta Bans
3. Chloris dolichostachya Lenguaea.
4. Cynodon dactylon (L.) Pers. Doob
5. Dendrochlamys strictus Nees. Bamboo, Bans
6. Dichanthium annulatum (Forsk.) Stapf.
7. Oryza sativa L. Rice, Dhaan
8. Saccharum munja Roxb. Jarpat, Munj
9. S. officinarum L. Sugar cane, Ganna
10. Sorghum vulgare pers. Jowar
11. Triticum aestivum L. Wheat, Gahun
12. Vetiveria zizanioides (L.) Nash. Khus
13. Zea mays L. Corn, Makka.

CHAPTER IV

SYSTEMATIC ENUMERATION OF SPECIES

DICOTYLEDONES

RANUNCULACEAE

Delphinium ajacis L. An erect annual ornamental herb with decomposed, alternate exstipulate leaves. Inflorescence long, racemose. Flowers variously coloured, zygomorphic spurred posteriorly, hypogynous, bisexual complete with two bracteoles. Fruit is a follicle. Can be used in class as raceme, follicle and spur.

Common name - The Lark spur

Flowers - winter January-February.

Fig. 1

Nigella arvensis L. An erect annual herb. Often cultivated for flowers and seeds. Leaves alternate. Pinnately multifid to linear or filiform parts. Flowers white or blue subtended by a leafy involucre. Sepals 5, petaloid. Many seeded capsule dehiscing at top.

Common name - Fennel flower.

Flowers - Winter January-February.

Fig. 2

^A MAGNOLIACEAE _A

Michelia champaka L. Evergreen tree with straight trunk, branches and leaves form a close oblong crown. Leaves are oblong, lanceolate, entire or wavy. Flowers solitary, axillary enclosed in bud by deciduous bracts. Petals and

sepals are 15-21, deep yellow or orange. Anthers numerous in many whorls. Gynophore stipitate, carpels numerous fruit is a capsule. Flowers are scented. For the class, bracts scented flower and capsules are useful materials.

Common name - The champak tree or Champa.

Flowers - April to Sept.

Fig. 3

ANNONACEAE

Annona squamosa L. A small cultivated tree, evergreen. Leaves are long (2-8 cm), oblong, petiolate. Flowers solitary, opposite to leaves, fragrant, drooping, yellowish green sepals 3, petals 6. Stamens many, carpels many, apocarpous. Fruit globose, 5-12 cm. across yellowish green when ripe filled with many one seeded pulpy cells. Seeds smooth shiny dark brown to black.

Common name - Custard apple or Sharifa.

Fig. 4

Polyalthia longifolia Thw. A tall evergreen straight tree with a close pyramidal crown. Leaves narrowly lanceolate, long, acuminate with undulate margin. Flowers in short peduncled tomentose cyme, star like, yellowish green, without smell, sepals 3, petals 6, stamens and carpels many.

Common name - The mast tree or False Ashok.

Flowers - Feb-May.

Fig. 5

PAPAVERACEAE

Argemone mexicana L. A prickly erect annual herb to bushy undershrub. Stems and branches woody. Leaves simple alternate extipulate, subsessile, pinnatifid, lobes dentate spiny on margin and on veins beneath. Whole spotted along the veins with sharp prickles. Flowers solitary terminal with prickly peduncles, yellow or yellowish white. Petals in two whorls, foliaceous bracts, stamens many, carpels 4-5 syncarpous, unilocular, superior ovary with many ovules arranged on parietal placentation. Ovary covered with soft spines. Fruit is a prickly leculicidal capsule.

Common name - Mexican poppy or Prickly-poppy Bhadbhand.

Flowers : Feb-June, almost round the year.

Fig. 6

Papaver rhoeas L. Var. latifolius (P. argemone).

An erect, annual herb juicy, stem, hollow, hairy. Leaves radical and cauline, alternate, extipulate, sessile with a sheathing leaf base, simple, ovate, serrated, pinnately formed lobes, acute, unicostate, reticulate, hairy. Flowers solitary terminal or axillary drooping, bisexual complete, sepals 2, petals 4 in two whorls, scarlet, crumpled in bud. Stamens numerous in 2-3 whorls. Ovary polycarpellary syncarpous, superior unilocular. Parietal placentation. Stigma forming a crown at the top. Pericardial capsule with numerous seeds.

Common name - Garden Poppy

Flowers - Cold season, Dec. to March.

Fig. 7

FUMARIACEAE

Fumaria indica (Haussak). Pugsley.

A much branched annual weed. Latex absent. Leave decomound, alternate, extipulate. Inflorescences raceme flowers bracteate, purplish, zygomorphic, spurred laterally. Sepals 2 free, petals 4 in 2 whorls, free, 2 outer lateral dissimilar. One flat and other spurred basally, enclosing the nectary. 6 stamens united in two bundles. Ovary bicarpellary, syncarpous, superior. One seeded capsule.

Common name - Fumitory.

Flowers - Cold season.

Fig. 8

BRASSICACEAE (CRUCIFEREAE)

Brassia campestris L. var Sarson

Tall erect annual herb. Leaves lyrate, flowers in oblong corymbs. Petals clawd, cruciform, bright yellow. Pods or siliqua normally 2 valved, 2 celled.

Common name - Black Mustard, Sarson

Flowers - Januar, tp April.

Fig. 9

VIOLACEAE

Viola tricolor L

Annual herb cultivated for variously coloured flowers.

Common name - The Pansy

Flowers- Winter season.

Fig. 10

CARYOPHYLLACEAE

Dianthus caryophyllus L. - It is an ornamental, erect annual herb with simple, opposite, decussate, extipulate, sessile leaves of entire margin. Flowers are solitary terminal or in dichasial cyme, bracteate, bisexual, actinomorphic complete, hypogynous, calyx 5, united, corolla 5 or more petals free. Stamens 10 in two whorls. Ovary bicarpellary syncarpous superior, unilocular at the base and bilocular at the apex, numerous ovules on free central placentation. Fruit is a capsule.

Common name - Carnation

Flowers - Cold season

Fig. 11

PORTULACACEAE

Portulaca quadrifida L. - A small diffuse or prostrate annual plant with filiform soft fleshy stem rooting at nodes. Leaves subsessile flat succulent. Stipule with a ring of white hairs. Petiole short. Flowers small yellow with involucre and long silky hairs. Sepals hyaline united at the base. Petals 4 yellow, Stamens 8 style 4 fid. Capsule conical. The flowers close at noon and open at 2 PM again.

Flowers - Sept-Oct.

Fig. 13

MALVACEAE

Abutilon indicum (L.) SW. - A much branched undershrub herbaceous and somewhat woody. Leaves roundish, ovate to orbicular, cordate, irregularly dentate, petiole usually

longer than the blade. Flowers solitary, axillary, yellow or orange yellow. Corolla with spreading petals, staminal tube hairy at the base.

The flowers open at noon

Common name - Kanghi

Flowers - Rainy Season upto Dec.

Fig. 14

Gossypium hirsutum L - It is a coarse, much branched bush. Young parts are hairy, leaves simple to lobed. Thick, cordate at the base. Flowers large, showy, yellow, without a dark centre, with free bractioles. Capsules spherical and acute.

Common name - Cotton or Kapas

Flowers - Sept to Nov.

Fig. 15

Malvastrum coromandelianum (L.) Gracke, Erect much branched shrub, hairy with simple, acute, serrate, hairy leaves. Petioles 3-12 cm. long, hairy with linear stipules. Flowers solitary, axillary, pale yellow, bracteate with linear bracteoles, 5 lobed, campanulate, calyx lobes triangular. Petals 5, longer than sepals. Carpels 8-12, united.

Flowers July to November.

Fig. 16

Sida cordifolia L. - A diffuse or erect herb with hairs above. Leaves cordate, petiolate, linear stipules. Flowers white or pale yellow, axillary, solitary. Calyx lobe ovate, acute. Carpels 7-10.

Flowers - Aug to Dec.

Fig. 17

TILIACEAE

Cercherus trilocularis L.

Annual or perennial diffuse undershrub, branching from near the ground. Leaves oblong shining. Flowers yellow, cymose inflorescence. Buds ovoid or obovoid, apiculate, peduncles very short, hairy. Sepals linear-oblong, petals longer than sepals. Capsules with a short beak, hairy when young 3-4 angled 3-4 valved. Valves with transverse partitions between seeds.

Flowers - June to Octo.

Fig. 20

Cerchorus capsularis L. - Annual herb with lanceolate or oblong, acuminate, rarely ovate lanceolate leaves. The serratures produced into a filiform appendage, base rounded or acute. Petioles shorter upward, slender, glabrous. Filiform stipules. Flowers yellow in short cymes, buds obovoid. Capsules sub-globose or globose, unbeaked, depressed at the apex, 5 valved.

Common name - Jute or Kharenti

Fig. 19

Cerchorus aestuans L. A much branched herb. Leaves hairy ovate, acute, serrate, a filiform appendage on both the sides of lamina at the base. Flowers small yellow in cymes opposite to leaves. Sepals linear, oblong, apiculate. Petals spatulate, longer than sepals, capsules short, 5 angled, 3 of the angles winged.

Flowers - Aug to Oct.

Fig. 18

100

LINACEAE

Linum usitatissimum L. An erect, annual cultivated herb with linear leaves. Flowers large in corymbose panicles. Petals blue. Stamens 5, ovary 5 celled, capsule, 5 celled, spherical.

Common name - Flax, linseed, Alsi

Flowers - Cold season.

Fig. 21.

OXALIDACEAE

Oxalis latifolia H.B. and K.

A stemless pubescent perennial herb. Leaves radical with divergent and oval leaflets, apices are board, not rounded, tapering towards the ends. Teachers can use it to demonstrate trifoliate palmately compound leaves.

Common name - Khat-mithi.

Fig. 22

TROPAEOLACEAE

Tropaeolum majus L. - An annual herb which is succulent, tubercous and juicy. Leaves are alternate, with long petioles, entire. Flowers are zygomorphic, bisexual, showy and spurred. Sepals 5 united spurred. Petals 5. Stamens 8. Ovary tricarpeillary syncarpous superior, 3 locular with simple style and 3 lobed stigma. It is a garden plant. Teachers can use flowers to demonstrate the spur in a flower.

Flowers - cold seasons.

Fig 23

RUTACEAE

Citrus limon (L.) Burm. - It is a small tree with thorns on branches. Flower buds are pinkish, ovate, leaves with winged petiole. Fruit - medium sized spherical hespiridium. Cultivated for fruits. Useful for teachers to demonstrate winged petioles and hespiridium fruits.

Common name - The lemon or Nimbu

Fig. 24

MELIACEAE

Azadirachta indica A.Juss.

It is the famous neem tree known all over. With straight trunk and many branches. Leaves imparipinnate, crowded near the ends of branches. Leaflets 9-15, sub opposite, obliquely lanceolate, acuminate, serrate, bright green. Flowers numerous in axillary panicles, bracteate with minute bracts. Calyx 5 lobed, anthers 10 united to form a staminal tube. Fruit is a drupe ovoid or oblong in shape.

Flowers - During summer

Common name - The Neem tree.

Fig. 25

RHAMNACEAE

Zizyphus mauritiana Lam.

A moderate sized tree. The leaves are elliptic fuscous tomentose beneath. Prickles solitary or paired. If paired, one will be curved. Flowers greenish yellow in short axillary cymes. Ovary half sunk in disc. Ovoid. Fruit is a drupe 1.5 to 2 cm. or longer. Yellow or orange when ripe.

Common name - Indian Jujube - Ber.

Flowers: Cold season

Zizyphus nummularia (Burm. f.) Wt. & Arn.

A thorny bush, much branched. Leaves small spinous with stipular prickles, always in pairs, one straight, the other shorter hooked, lamina with mainly 3 veins. Flowers in short axillary compact cymes, pale yellow. Calyx lobe triangular. Fruit is drupe 1-15 cm long, globose, shining red when ripe.

Common name - Kanta bar

Flowers - Oct-Dec.

Fig. 27

ANACARDIACEAE

Mangifera Indica L. It is a giant tree with a huge crown of evergreen leaves, which are simple, alternate, crowded at the tips of branches, acute or acuminate dark green, shining, entire margin. Petioles 1-6 cm long. Flowers small in large pubescent panicles. bracts elliptic, bracteoles ovate, small. Petals 4-5, imbricate, oblong. Fruit is a drupe of large size. For teachers drupe is important.

Common name - The Mango tree or Aam

Flowers - Feb-March.

Fig. 28

MORINGACEAE

Moringa oleifera Lam.- Small tree with corky bark and soft wood. Leaves usually tripinnate. Petioles slender and sheathing at the base. Pinnae opposite, 4-6 pairs. Flowers arranged on branched panicles. Bracts linear calyx 5 lobed. Petals 5 white, Anthers 5-7, ovary oblong

hairy, one celled, ovules many capsules 20-50 cm long, pendulous, 9 ribbed, seeds 3 angled, winged. Useful to teachers for the demonstration of tripinnate compound leaves and long capsules.

Common name - The drum stick, Munga, Sahjan

Fig . 29

PALILIONACEAE

Aeschynomene indica L. Undershurb, much branched, branches are slender glabrous. Leaves imparipinnate with glandular prickles on rachis, stipules, deciduous. 21-71 subsessile, alternating leaflets on each rachis. Flowers small, yellow in 1-4 flowered axillary racemes. Membranaceous bracts, bractioles are minute. Calyx 2 lipped. Upper having two and lower 3 teeth. Corolla twice the calyx. Ovary stalked, styled incurved. Pods are flat, jointed with 6-10 joints, 1 seeded.

Flowers - Sept to Nov.

Fig. 31

Abrus precatorius L. Climber, perennial with numerous branches, glabrous and silky. Leaves paripinnate in 10-20 pairs, ligulate. Flowers in racemes. Calyx teeth short, corolla 3-4 times the calyx, pink or white with a pink tinge. Ovary many ovuled. Style curved, short, stigma capitate. Pods oblong, 3-5 seeded. Seeds usually scarlet with a black spot or a white seeds with black spot. Seeds are highly toxic hence the teachers must be very careful in handling the plants.

Common name - Ratti,

Fig. 32

Alysicarpus bupleurifolius D.C - Annual herb, with jointed stem which is thin and slender. Leaves are stipulate, alternate, lanceolate, with very short petioles flowers are small, pink with short peduncles. Calyx, lobes linear 2, anterior ones often connate, stamens diadelphous. anthers uniform. Pods are jointed with persistent calyx.

Flowers - Fruits: Sept to Nov.

Fig. 32

Cajanus cajan (L.) Millsp. An erect shrub, extensively cultivated for seeds used as pulse. Much branched. Leaflets 3, long, lanceolate, acute, entire, densely silky beneath. Stipules are minute, caducous. Flowers are large showy in corymbose racemes. Pedicels downy. Corolla 3 times longer than calyx. Yellow. Pods narrower at the ends.

Common name - Pigeon Pea, Tuar or Arhar

Fig. 33

Medicago indica All. syn. Trifolium indicum L.

Plants are annual, herbaceous weeds with slender stems and pale branches. Leaves 3 foliate, toothed, rounded or obovate with a few scattered hairs on both the sides. Inflorescence a raceme, Pedicels short, bracts subulate, calyx teeth triangular, corolla twice the calyx. Pods glabrous, ellipsoid, compressed, tapering at both the ends one seeded or sometimes two seeded.

Flowers - and - Fruits - Cold season

Fig. 34

Tephrosia purpurea (L.) Pers. - It is a common weed of waste places having a much branched, sub erect, herbaceous branches. Leaves with short petioles, imparipinnate with 9-21 leaflets. Oblanceolate, silky beneath. Flowers red, purple or white in racemes. Short pedicillate bracteate. Calyx as long as pedicels, densely silky. Linear teeth as long as calyx. Pods linear, curved, seeds 5-6, per pod.

Common name - Wild Indigo Sarphunka

Flowers - Sept to Nov.

Fig. 35

Zornia gibbosa span. A common herb found in sandy places with diffuse annual, much branched stem. Leaves with stalk, stipules lanceolate, acute, strongly nerved. Leaflets are sessile, variable in size and shape, glabrous. Inflorescence is a cyme of 3-12 flowers. Flowers are small with large bracts, foliaceous. Calyx membranous. Two upper teeth broad and the two lateral smaller. Lower teeth smallest. Corolla twice as long as calyx, pods glabrous with numerous bristles.

Flowers - Fruits - Rainy season.

Fig. 36

CRESALPINIACEAE

Cassia obtusifolia L.Syn. Cassia tora L.

It is a very common weed of wasteland along road sides.

Plants are annual, herbaceous pedicels are longer. Leaflets are 3 pairs with a single conical gland between the lowest

pair of leaflets only . Bright yellow flowers and subterete, glabrous, transversally reticulate 30-35 seeded pods.

Flowers Sept to Dec Fruits Winter

Common name - Chakvad

Fig. 37

Poinciana pulcherrima L. It is an ornamental shrub armed with a few weak prickles. Leaflets oblong, . tuse. Flowers with long peduncles. Calyx lobes oblong. Inferior one larger and hood shaped. Stamens 10, free, filaments long bright red. Styles longer than corolla. Pods thin flat linear. Useful to teachers for bipinnate compound leaves, paniced raceme and flat, thin pods.

Common name - The Peacock flower

flowers: Summer to rains or even longer.

Fig. 38

Tamarindus indica L. Huge tree planted for fruits and dense crown. Leaflets opposite linear - oblong, obtuse, stipules minute, linear, caducous. Bracts concave, enclosing the buds. Petals yellowish with red stripes. Stamens 3 fertile and rest sterile, monadelphous. Many ovules in each ovary. Pods falcate, pulpy inside, oblong slightly compressed. Seeds 3-12 dark brown shining.

Flowers June-Aug. Fruits cold season.

Common name - Tamarin or Imli.

Fig. 39

MIMOSACEAE

Acacia auriculiformis A.Cunn. A handsome tree, straight evergreen xerophytic, smooth, white bark and pendulous branches. Phylloides are laterally compressed, falcate oblong, coriaceous, parallel veined tapering at ends. Flowers small yellow or yellowish white in spikes. Calyx campanulate, minutely toothed. Petals spreading as long as the calyx. Pods are hard woody, brown and dehiscent.

Common name - The Australian Phylloide Acacia.

Flowers - Fruits at various times a year.

Fig. 40

Acacia nilotica (L.) Del. Sub Sp. indica (Benth.)

Evergreen much branched tree with profuse branching and sharp straight spines. Leaves bipinnate, pinnae 2-6 pairs. Leaflets 10-25 pairs, subsessile, linear, oblong. Flowers yellow, fragrant, globose heads, peduncles slender. Calyx teeth minute. Corolla double the calyx. Pods usually solitary stalked, 8-12 seeded, deeply constricted. Stem yields gum. Spines are strong, long and pointed.

Common name - Babul, Kikar

Flowers - Aug-Dec. Fruits Jan-March.

Fig. 41

Mimosa pudica L. A diffuse, much branched tiny undershrub. Leaves sensitive to touch, digitate, pinnae 1-2 pairs, leaflets 10-20 pairs. Flower head dense, globose, long peduncled. Corolla pink or purple. Stamens 4, Pods flat, slightly curved with 3-5 segments prickly.

Common name - Sensitive plant, Touch-me-not
Laiwantai, Chui Mui

Flowers: Aug-Oct, Fruits Nov-Dec.

Fig. 42

CRASSULACEAE

Kalanchoe pinnata (Lam.) Pers. Syn.

Bryophyllum pinnatum (Lam.) Oken.

A perennial succulent herb. Stem obtusely 4 angled. Leaves are opposite. Lower leaves generally simple occasionally compound. Inflorescence is a large panicle. Flowers are large, showy pendant, pale greenish or reddish purple. Calyx 4 fid, deltoid, inflated, campanulate, valvate. Corolla urceolate, 4-fid, nearly covered, constricted in the middle, swollen at the base stamens 8, carpels-4, style green. Fruit enclosed in calyx. A follicled, many seeded.

Plant is well known for vegetative propagation through buds arising from leaf margins.

Common name - Life plant, Pathar ghat

Fig. 43

MYRTACEAE

Callistemon lanceolatus D.c - A large evergreen tree with brown fissured bark with numerous pendulous branches and crimson bottle brush like inflorescence. Leaves alternate lanceolate. Flowers on sessile terminal spikes with deciduous dry sepals. Stamens are numerous, long exerted, brightly red giving the colour to the flower. Ovary 3-4 celled. Fruit is a loculicidal capsule. Teachers can use the long pendulous spike as an example.

Common name - The bottle brush tree.

Flowers - Oct-March.

Fig. 44

Psidium guajava L. A small much branched tree with reddish brown wood and scaly brownish bark. Leaves opposite, coriaceous, oblong. Flowers on axillary peduncles, 1-3 flowered. Sepals united, Petals free. Fruit many seeded berry with white, yellow or pink pulp.

Common name - The Guava, Anrud.

Flowers : July-Sept.

Fruits - Winter Season.

Fig. 45

Syzygium cumuni. (L.) Skeels. A large tree with a huge crown. Trunk covered with smooth grey bark, leaves oblong ovate, shining single entire, gland dotted, petiolate. Flowers tetramerous, sub-sessile. Calyx tube funnel shaped. Petals united to a calyptra and falling off in one piece. Fruit one seeded berry, ovoid or oblong, dark purple, juicy.

Common name - The Java plum tree, Jaman

Flowers - April-June, Fruits June-July

Fig. 46

LYTHRACEAE

Lagerstroemia indica L. It is much branched ornamental shrub. Leaves glabrous, acute or sub-obtuse. Elliptic or oblong. Some leaves fall during winter. Flower of different colours, and sizes are found. Inflorescence is a panicle. Sepals triangular, petals long clawed. Fruit is a woody capsule.

Common name - Crape Myrtle, Guli-phanees

Flowers - March July.

Fig. 47

Lawsonia inermis L. A useful hedge plant as it is a glabrous shrub. Sessile leaves are opposite and elliptic. Flowers yellowish white with pungent smell, borne on terminal cymes or corymbose panicles. Calyx tube minute, 4 lobed, persistent. Petals 4, inserted at the top of calyx tube, wrinkled. Stamens 8, ovary 2-4 celled, ovules numerous on axile placentation. Fruit is a capsule with many seeds.

Common name - The henna plant, Mehndi

Fig. 38

ONAGRACEAE

Ludwigia perennis L. Herb found in moist places. Stems erect, paler, narrowed to base. Flowers solitary, axillary on short pedicels small, yellow, tetramerous, calyx tube with 4 lobes, Petals 4, stamens 4, ovary 4-5 celled. Numerous ovules 4 angled capsule crowned by calyx lobes.

Flowers - May-Aug.

Fig. 49

PASSIFLORACEAE

Passiflora foetida L. - It is climber grown in gardens for its flowers. Leaves are palmately 3 lobed, hairy. Flowers greenish, solitary axillary with an involucre of finely dissected bracteoles (usually 3) capillary glandular segments calyx tube fleshy with 5 lobes. Petals 5, inserted. There is a gynandrophre surrounded by a shallow cup, covered with a corona. Stamens 5, emerging from the gynandrophre. Ovary 1 celled with several ovules. Styles usually 3 Fruit like a small goose berry.

Common name - The Passion flower, Prem shakri

Flowers- Fruits-Rainy and cold season.

Fig. 50

Luffa cylindrica (L.) M. Roem. An extensive climber grown for fruits. Tendrils 3-fid. Leaves orbicular, reniform palmately 5-6 lobed. Lobes acute or acuminate, distantly denticulate, punctate on both surfaces. Petioles angular. Flowers unisexual yellow, large, showy. Male and female on the same axil. Male ones on 4-20 flowered racemes, crowded at the top, bracteate. Calyx pubescent, lobes lanceolate, acute. Petals spreading yellow with green veins. Stamens 5. Female flowers solitary with 5 staminodes. Ovary cylindric, oblong, glabrous. Fruit not ridged, cylindric. Seeds black.

Common name - Tori, Gilki.

Flowers - Fruits - July-Oct.

Fig. 51

Melothria maderaspatana (L.) Cogn. A branched climber found as weed on the wastelands. Tendrils are not divided, leaf opposed. Leaves orbicular, reniform, palmately 3-5 lobed. Lobes acute, acuminate, minutely denticulate. Petioles angular. Flowers small, axillary. Calyx campanulate hairy 5 lobed. Corolla larger than calyx, 5, spreading, stamens 5, ovary subaphical oblong. Flowers are yellow. Fruits bright red.

Flowers - July-October.

Fig. 52

MOLLUGINACEAE

Mollugo pentaphylla L. A small erect or diffuse wild plant found during rains on foot-paths and wastelands. Plants are annual with slender 4 angular stems. Which are leafy, dichotomously branched, leaves nearly sessile, opposite, lanceolate and acute to obtuse, narrow at the base. Inflorescence is a dichasial panicle bearing minutes greenish-white flowers. Sepals round oval or elliptic. Stamens 3-5, ovary 3 celled, styles 3, short. Fruit is a many seeded 3 sided capsule.

Flowers - Sept-Nov.

Fig. 53

APIACEAE

Coriandrum sativum L. An extensively cultivated annual herb used as condiment. Seeds and leaves are used in cooking. Plant is a slender branched glabrous herb with strong smell. Leaves pinnately decompound. Inflorescence is a compound umbel. Inner flowers are actinomorphic, white outer ones zygomorphic. Small and white. Bracteoles present. Sepals acute, petals emarginate. Fruit ribbed. Seeds convexo concave.

Common name - Corinder Dhania

Flowers - Dec-April.

Fig. 54

RUBIACEAE

Ixora arborea Roxb. - Found in deciduous forests and grown in gardens for foliage and flowers. It can be called as a large much branched shrub. Leaves opposite

elliptic or oblong-ovate acute with short petioles. Stipules interpetiolar, short triangular. Flowers white or pink in corymbose panicles. Bracts and bracteoles minute, 4 toothed minute calyx tube supports 4 lobed corolla tube. Stamens 4, Inserted on the mouth of corolla tube. Ovary two celled and two seeded. Fruit is 2 seeded berry. Plant is useful for teachers to demonstrate the interpetiolar stipules and corymbose panicles.

Common name : The torch tree, Kanta gandhal

Flowers : The summer and rainy seasons.

Fig. 55

Mussaenda glabrata (Hook f.) Hutchinson. It is an ornamental shrub found in gardens. One of the calyx segments enlarges and extends conspicuously. For teachers it is a useful part to demonstrate the fact that the flower is a modified shoot.

Common name: Sarvad.

Flowers - Almost throughout the year.

Fig. 56

ASTERACEAE (COMPOSITEAE)

Helianthus annuus L. - A n ornamental herb cultivated in gardens for yellow and showy head inflorescence. Leaves are large, coriaceous. The plant can be used in the class for the study of anatomy of stem. Commonly quoted in text books. as an example of a typical dicot. stem, for collateral vascular bundles and pericyclic and phloem ^{sc}scle^{ch}hyme bundle cap ; resin ducts in cortex. The inflorescence is a head inflorescence with disc and ray florets. Basal placentation and pappus are other important features.

Flowers: almost throughout the year

Common name: The sun flower, suraimakhi

Fig. 57

SAPOTACEAE

Madhuca indica Gmel. It is a large deciduous tree with dense crown found in forests and road sides as avenue trees. The fleshy corollas are eaten raw or cooked or the country liquor is fermented out. Seeds yield oil used for cooking and burning lamps. In class, the teachers can find leaves and flowers useful. Leaves are elliptic ob^ovate, flowers cream coloured, fragrant, drooping, rusty tomentose. Fruit a berry, ovoid, greenish, 1-4 seeded.

Common name - The Indian butter tree, Mahua

Flowers March-April, fruits June-July.

Fig. 58

APOCYNACEAE

Cariaca carandas L. A large evergreen shrub grown for fruits which are used for pickles, jams and chutney. The teacher can use this plant for the demonstration of dichotomous branching and spines on the stem. Leaves elliptic or obovate. Flowers white not fragrant on 10-20 flowered corymbose cymes. Fruit is a dark purple berry, 4 or more seeded.

Common name - Karunda

Flowers : Jan-April. Fruits June-Aug.

Fig. 59

Catharatus roseus (L.) G. Don. Syn. Vinca rosea L.

It is a very common garden herb, perennial. Flowers through the year, colour-white or pink, usually paired, sessile in axils. Fruit is a follicle. The plant produces a smell. Sepals 5, free, corolla 5, united, twisted, stamens five, epipetalous. Gynaecium 2, carpels united.

Common name : Sada-Bahar.

Flowers and fruits - Year round

Fig. 60

Nerium indicum Mill. It is a perennial shrub with white latex - Leaf simple, extipulate entire, elliptical leathery. Veins nearly parallel. Inflorescence terminal panicle cyme. Flowers bracteate, bisexual, complete, actinomorphic, cyclic and hypogynous. Calyx - 5 sepals free, corolla 5, united funnel shaped with coronal appendage near the mouth, pink red, twisted, stamens 5. epipetalous filaments short. Gynaeceum-bicarpellary, syncarpous, bilocular.

Common name - The Oleander, Kaner

Flowers: Throughout the year.

Fig. 61

Tabernaemontana divericata (L.) R.Br. It is an evergreen dichotomously branched large shrub. Plant is useful for the teacher in demonstration of dichotomous branching and reticulate venation. It is good for hedges. The plants are not browsed by cattle. Flowers are white fragrant single or double.

Common name - Chandani

Flowers. May-Oct.

Fig. 62

ASCLEPIADACEAE

Calotropis procera (Ait.) R. A large shrub with milky latex. Leaves are simple, opposite, decussate, extipulate petiolate or sub-sessile, entire, broad, ovate-oblong. Inflorescence - umbellate cyme. Flowers bracteate, bracteoles two, bisexual, complete, actinomorphic, cyclic

hypogynous. Sepals 5 free. Corolla-5 petals free.

Pollen grains united in Pollinia. Lodged at the angles of 5 cornered gynostegium developed due to fusion of anthers and stigma. Gynaecium - bicarpellary, superior. Ovaries separate at the base, each unilocular.

Fruit - a smooth, turgid, recurving follicle. Seeds. Small brown hairy.

For teachers- Stem is useful as substitute pith material.

Latex for physiology classes. Opposite decussate leaves.

Gynostegium, pollinia, follicles and hairy seeds are useful.

Common name - Madar, Akva

Flowers and fruits - Cold and hot seasons.

Fig. 63

HELIOTROPIACEAE

Heliotropium supinum L. A prostrate or decumbent, villos herb commonly found on dry clayey soil in drying ponds, and also on the banks of rivers. Stem much branched spreading from the centre, clothed with soft white hairs, leaves petiolate, alternate; Flowers subsessile in simple or branched cymes. Fruits ovate to sub-globose 2-4 nutlets, enclosed in persistent calyx.

Flowers- winter and summer

Fig. 64

Trichodesma indicum. R.Br. It is much branched and erect herb frequently found by road sides and in waste lands. The plants look grey-villous and hispid. Flowers pale blue or violet or white with brown throat & calyx lobes cordate or hastate at the base. Corolla lobes ovate. Fruit is a nut.

Flowers : During the cold season.

Fig. 65

CONVOLVULACEAE

Evolvulus alsinoides L. A very common prostrate or ascending herb on moist or dry sandy soils. Stem is much branched, densely hairy, perennial. Root stock is woody. Leaves are closely arranged on prostrate branches are small hairy. Flowers light blue, solitary or in pairs from an axillary peduncle. Sepals small, lanceolate, hairy. Corolla sub-rotate. Capsule 4 seeded. Seeds irregular dark brown.

Flowers - July-Dec.

Fig. 66

Ipomoea fistulosa Mart. ex. Choisy - A very common large, suberect, diffuse or straggling shrub with milky juice. It is a rapidly spreading gregarious plant often grown as hedge. Leaves ovate, cordate, acuminate. Flowers large pink or pale rose coloured with a long tube, dichotomous, axillary or terminal cymes. Useful for teachers as the plants are easily available every where.

Common name - Besharam

Flowers: Winter and early summer.

Fig. 67

Ipomoea cairica (L.) Sweet. An extensive climber commonly grown in hedges of gardens and also planted as ornamental creeper at railway stations, stem twisted, striate, rough with lenticles. Leaves long petioled pⁱⁿtafid. Flowers - large campanulate. 1-3 flowers on penduncles.

Common name - The Railway Creeper.

Flowers - almost all the year round.

Fig. 70

Ipomoea nil (L.) Roth. A wild hedge plant which is a twining shrub. Leaves ovate, cordate flowers in bunches of 1-5. Bracteate, linear bracts, sepals linear lanceolate, capsule 3 celled, 6 ovuled, subglobose. Plants are of medicinal value. Seeds are used as purgative.

Flowers : Aug-Dec.

Fig. 68

Ipomoea aquatica Forsk. Syn. I. reptans.

It is an aquatic creeper found in ponds and puddles. Stem is smooth fistular. Leaves alternate simple, entire almost triangular with acute to sub-acute apex. Flowers axillary, solitary, regular complete bisexual pale rose coloured.

Flowers : Rainy and cold seasons.

Fig. 69

Ipomoea quamoclit L. A delicate annual climber grown in garden for its fine foliage and bright red showy flowers. Leaves pinnately divided into filiform segments. Flowers in bunches of 1-5 white or bright red corolla funnel shaped.

Flowers-June to Sept.

Fig. 71

Cuscuta reflex Desb. A leafless twinner and stem parasite. Commonly found on shrubs and small trees, sometimes almost covering the host during the winter season. Stem very long, delicate, pale greenish yellow. Rarely with tinge of red dots. Flowers solitary or in umbels of 2-4 flowers. Sessile or sub-sessile, fleshy bracts calyx divided at the base and fleshy, corolla pale white, cylindrical. Lobes reflexed. Stamens inserted at the throat of the corolla tube. Fruit is a capsule with 2-4 black seeds.

Common name- Dodder or Amarbel

Flowers - Cold season.

Teachers can use it as an excellent example of stem parasite and also Haustoria.

Fig. 72

SOLANACEAE

Datura metel L. It is a shrubby annual herb with erect herbaceous, dichotomously, branched, green, cylindrical stem. Leaves simple, alternate or sub-opposite pairs, which are unequal, exstipulate entire. Solitary terminal flowers are large, ebracteate, bisexual complete, slightly zygomorphic, hypogynous. Calyx five lobed, tubular long, loose, twisted corolla, 5 united trumpet, shaped, longitudinally veined, white, twisted. Androecium 5 stamens, free, epipetalous. Gynoecium bicarpellary, syncarpous bilocular, axile placentation, ovary oblique, ovary wall prickly, capsule 5 valved prickly.

Plants are useful in the class for the demonstration of structure of flower, gamosepalous and gamopetalous conditions, epipetalous stamens, oblique ovary, axile placentation and capsule.

Common name - Datura

Flowers- Chiefly in rainy season.

Fig. 73

Petunia nyctaginiflora Juss.

It is an ornamental garden plant, various parts of this plant can be used in the class as substitute to Datura metel. Specially the flowers.

Flowers : Cold season.

Fig. 74

Solanum melongena L. A cultivated annual undershrub may or may not be prickly. Leaves are sinuate or lobed, flowers are blue in colour and rotate. Fruit is a berry.

Common name - The brinjal , Baigan

Flowers: Rainy season.

Fruits - Cold season.

Fig. 75

Solanum nigrum L. An annual herb, leaves simple, alternate but sub-opposed apically. Cyme inflorescence, Flowers ebracteate, bisexual, complete, pentamerous, calyx 5, united corolla 5 united, rotate, white, imbricate, Stamens 5, epipetalous, Gynaecium bicarpellary, syncarpous, superior. Ovules numerous per locule on axile placentation. Fruit - berry with a saucer like persistent calyx.

Common name- Black Night shade, Makai

Flowers and fruits cold and hot seasons.

Fig. 76

Withania somnifera. Plants are undershrub, stem tomentose with much branched stellate hairs. Leaves simple, alternate, entire, ovate acute. Flowers borne on umbellate cyme with gamosepalous calyx, corolla-5 united, Androecium 5, epipetalous. Gynaecium bicarpellary, syncarpous, superior. Fruit a berry.

Common name- Ashwagandha

Flowers: Summer and rainy seasons.

Fig. 77

SCROPHULARIACEAE

Russelia equisetiformis Schlecht. and Cham.

It is common garden shrub with an erect but drooping much-branched stem, resembling Equisetum when vegetative. Stems ribbed, much branched, green herbaceous with nodes very clear. Leaves whorled, linear, lanceolate or ovate, upper reduced to scales. Flowers numerous, red or bright scarlet, on 1-4 flowered peduncles, borne on drooping branches.

Common name- The coral fountain plant.

Flower - For most of the year.

Fig. 78

Striga angustifolia (Don.) Jald. A very variable herb growing in grassy places as a root parasite. Stems branched. Leaves linear, scabrous. Flowers white solitary, axillary forming interrupted terminal spikes or racemes. Calyx, 15 ribbed, campanulate, corolla tube exerted, upper portion hairy within. Capsule short.

Flowers: Rainy and winter season.

Fig. 79

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MARTYNIACEAE

Martynia annua L. A common wild plant found on road sides and wastelands. Annual herb but large in size. Roots deep yellow. All parts are velvety. Pubescent leaves large, ovate, dentate, glandular, long petioled. Flowers large, showy, diandrous, drooping, raceme. Bracteate, bracts petaloid. Corolla tube dilated above, stamens 2 perfect. Ovary 4 chambered, 4 ovuled. Stigmas sensitive, fruit dark brown to black, boat shaped with two curved horns for dispersal through animals, seeds 4, compressed.

Common name - Devil's claw, Bicchu, Kauva

Flowers : Aug-Sept.

Fruits - Oct-Nov.

Fig. 80

ACANTHACEAE

Adhatoda vasica Nees. A bushy shrub found in hilly tracts or planted as hedges. Evergreen, bushy, short internodes leaves opposite, elliptic or lanceolate, acuminate. Flowers sub-sessile in dense axillary spikes, drooping at the ends of branches. Bracteoles with ciliolate margins. Calyx 5 equal. Corolla-lipped, stamens 2, ovary two chambered, 2 ovules in each cell. Fruit a clavate capsule, 4 seeded.

Common name - Bansa

Flowers and fruits - Aug-April,

Fig. 82

Bakleria prionitis L. Commonly found in shady, protected areas and waste places. It is a bushy undershrub, leaves elliptic, acuminate, spinetipped, lanceolate, glabrous, base tapering into petioles. 2-4 spines in the axils. Flowers sessile in terminal axils or spikes. Bracts foliaceous, spine tipped, calyx segments unequal with sharp tips. Corolla slightly 2 lipped, upper 4 lobed, the lower entire, stamens 2 fertile and 2 staminodes. Capsule ovoid with a tapering beak, with 2 hairy seeds.

Flowers - Oct-Feb. Fruits March-June.

Fig. 83

Peristrophe bicalyculata (Retz.) Nees.

Herbaceous undershrub, common in shaded areas, often becoming gregarious. Plants are erect and profusely branched. Stems angular with 6 angles, slightly hairy. Leaves ovate, acuminate with rounded base, simple petiolate. Flowers in panicles, trichotomously branched, bracteate, with 2 opposite bracts. The bracts are opposite, unequal, 4 bracteoles. Corolla pink or rose, bilabiate. Fruit a capsule.

Flowers - Sept-June.

Fig. 84

Rungia repens (L.) Nees. A herbaceous plant commonly found in small patches on moist conditions. Leaves are lanceolate to oblong elliptic. Flowers on spikes. Bracteate, corolla white, blue or pink with dark spots.

Flowers and fruits - Cold season.

Fig. 81

VERBENACEAE

Clerodendrum phlomidis L. A large profusely branched shrub found in hedges. Leaves ovate or rhomboid, thin. Flowers in dichotomous cymes forming a rounded panicle. Calyx lobes not enlarged into fruit, long ovate acuminate. Flowers fragrant, white or pinkish with foliaceous bracts. Corolla tube 4 lobed. Fruit is a black, wrinkled drupe.

Flowers - Sept-March.

Fig. 85

Clerodendrum interme (L.) Gaertn.

A large shrub used ^{as} a hedge. Much branched stem with shining foliage. The leaves are subsessile, ovate, elliptic to obovate. Flowers white in umbelled axillary cymes; calyx teeth very small, corolla glandular, 5 lobed, white with purple red filaments of stamens give it the characteristic colour. Stamens 4 exerted. Style very long. Drupes pyriform subtended by calyx.

Common name - Vilavati Mehndi

Flowers almost throughout the year

Fig. 86

Holmskioldia sanguinea Ratz. - A large garden

shrub grown for its clusters of flowers. Leaves opposite, ovate to broad ovate-oblong acuminate, serrate, membranous, glabrous. Flowers in terminal racemes or panicles. Calyx united, salver shaped, membranous, red orange, finally turning brown in fruits. Corolla tubular, curved, bright red limb, 5 lobed, stamens 4, didynamous, exerted, ovary

4 chambered, ovule 1 in each cell. Style filiform, 5-fid. Drupe is obovoid 4 lobed 1-4 seeded.

Common name - Chinese hat plant.

Flowers - Nov-Feb.

Fig. 87

Lantana camara L. var. aculeata (L.) Mold.

A much branched shrub, common in hedges and lawns. Branches have minute prickles. Leaves are ovate or lanceolate, acute, serrate, scabrid, petiolate. Flowers variously coloured in short capitate spikes. Bracts lanceolate, exceeding the calyx. Calyx is 4-5 toothed corolla 4 - lobed tubular. Stamens 4, didynamous inserted. Ovary two celled. Ovule one in each chamber. Fruit is a drupe. Green when unripe, becoming dark brown to black after repening.

Flowers - Throughout the year, most commonly during the rainy season.

Fig. 88

Verbena sp. Small herb, erect, perennial, leaves long petiolate. Bracts equalling the sepals. Flowers red or pink. Plants are cultivated in gardens.

Flowers- Winter season.

Fig. 89

BIGNONIACEAE

Tecoma stans (L.) H.B. & K.

A hardy shrub commonly found in garden hedges with handsome 3-5 pinnate compound leaves which are

large showy, uncostate reticulate venation on leaflets⁻²⁰ of acute apex and serrate margins. Flowers are also large showy, complete, bisexual, regular and yellow. Fruits dehiscent linear capsules.

Flowers - Practically all the year round.

Fig. 90

LABIATEAE

Leucas aspera (Willd.) Spreng. Annual herbaceous weed. Stem quadrangular, pubescent. Leaf simple opposite, decussate, extipulate, linear, acute. Inflorescence axillary verticillaster. Flower bracteate subsessile bisexual, complete, heteromeric, zygomorphic, cyclic bilabiate, hypogynous. Calyx 10 toothed, gamosepalous tubular, curved with oblique mouth, valvate. Corolla 5, gamopetalous, bilipped, upper lip formed by two petals while the lower by 3 petals. White. Stamens 4, epipetalous, didynamous. Gynaecium bicarpellary, syncarpous bilocular. One ovule per locule. Fruit nutlets.

Common name-Gepha.

Flowers Fruits-Aug-Feb.

Fig. 91

NYCTAGINACEAE

Euphorbia diffusa L. A very common diffuse herb in open areas, grassy waste places, road sides and in the crevices of old walls. Medicinally valuable. Root is stout. Plant spreads on the ground with many procumbent branches. Thickened on the nodes often purplish. Leaves broadly ovate, rounded at both ends, entire or wavy, often pinkish. Petiole as long as lamina. Flowers

dark pink, 4-10 together in small umbels arranged in corymbose panicles. Bracteoles small, perianth with limb plaited in bud. Campanulate tube constricted above the ovary, stamens 2-3. Fruit clavate, 5 ribbed glandular.

Common name Punarnava

Flowers and fruits-Throughout the year.

Fig. 92

Bougainvillea glabra Choisy. A large climbing shrub grown in gardens with straight spines on the stem and branches. A good plant for anomalous secondary growth, stem spines and large showy bracts. Teachers can use it to demonstrate a typical cymose inflorescence (biparous cyme). Leaves broad, ovate oblong, petiolate, entire smooth. Flowers with attractive foliaceous variously coloured bracts.

Common name - Boganval.

*Flowers - Nearly throughout the year.

Fig. 93

Mirabilis jalapa L. Very common herb found in almost all the gardens. A large erect much branched herb with tuberous roots and succulent stem which are green to pinkish. Leaves are large, petiolate, ovate or cordate. Flowers white, red or yellow, showy, tubular funnel shaped. Opens late in the afternoon. Fruits leathery. Seeds wrinkled black, like black pepper or papaya seeds.

Common name : Four O'clock plant, Gulabhas

Flowers and fruits - Aug-Dec.

Fig. 94

AMARANTHACEAE

Achyranthes aspera L. It is a very troublesome weed when in fruits. Common in waste areas, annual, herbaceous, erect with straight branches. Stems quadrangular, hard. Good example of anomalous secondary growth and spike inflorescence for teachers. Leaves opposite, large ovate, acute glabrous, petiolate. Flowers greenish white, many, stiff in long terminal spikes. Bracts and bracteoles persistent ending in a spine. Perianth with 5 segments, 5 unequal filaments connate at the base into a cup with interposed staminodes. Anthers 2 celled, one seeded with short styles. Stigma capitate. Fruit a membranous utricle, oblong. Seeds brown.

Common name - Lathiera

Flowers and fruits - rainy and winter season.

Fig. 95

Amaranthus tricolor L. -

A profusely branching erect, diffuse, stout, glabrous herb found in wastelands and along roads. Stems striate. Leaves variable, petiolate, obovate. Flowers numerous in dense axillary clusters forming long distantly interrupted spikes, trimerous bracts and sepals ovate or awned. Styles 3, capsules void, rugose. Seeds black, biconvex.

Flowers and fruits winter season.

Fig. 96

POLYGONACEAE

Polygonum glabrum Willd. A large glabrous herb rooting from lower nodes, found along the beds of drying ponds and puddles. The plant forms a dense coverage. Stems brown or reddish below. Leaves lanceolate, acuminate glandular. Flowers pink in erect racemes forming terminal panicles. Perianth glandular. Anther reddish. Nutlets orbicular, biconvex, dark brown, polished.

Common name - Nali

Flowers and fruits - Sept-March.

Fig. 97

LORANTHACEAE

Dendrophthoe falcata (L.f) Ettings. A large much branched partial parasite commonly found on a large number of host plants such as Mangifera indica and Madhuca indica. Plants are shrubs with opposite leaves or alternate ones of variable shapes, leathery, pink petiolate. Flowers orange pink or sometimes white in short axillary racemes, on leafless nodes. Bracts minute ovate. Calyx tomentose, short 5 toothed. Corolla tube curved, lobes 5, reflexed, stamens erected. Style quadrangular. Fruit a black berry when ripe.

Common name - Banda

Flowers fruits - Dec to May

Fig. 98

Euphorbia hirta L. Prostrate, ascending herb, branching from the root stock. Stem and leaf has milky latex. Leaves elliptic or ovate, oblong with oblique base, dentate margin. Inflorescence is cyathium, axillary or terminal clustered in dense crowded cymes. Involucre stock or cup shaped. Three valued capsule. Plants are weeds found on waste land. Useful to teachers to demonstrate cyathium inflorescence and latex to the students.

Common name - Dudhi

Fig. 99

Euphorbia milli Ch-des-Moulins. A commonly grown plant in hedges and gardens. Famous for succulent, spinous stems and red involucred inflorescence. Syn. Euphorbia Splendens. Plants are much branched, spiny shrub with milky latex. Leaves very few, spatulate, obovate. Flowers showy in long peduncled dichotomous cymes. Each cyathium subtended by two semi-circular cuspidate bright red bracts. Flowers - Throughout the year.

Fig. 100

Phyllanthus sp. Plant is an elegant annual herb. Leaves are flattend or winged. Leaves overlapping subsessile linear-oblong, rounded or apiculate, stipulate. Flowers minute, yellowish, axillary, sessile, 5 sepals 3 stamens in staminate flowers. Ovary tricarpeillary globose. Fruit is a capsules. Found in shady moist places.

Flowers Sept-Dec.

Fig. 101

Ricinus communis L. Famous as castor tree, but the plants are tall annual or biennial herbaceous shrubs. Monoecious. Leaf simple, alternate, exstipulate with nectary at the base of petiole. Palmately partite, serrate, acute, multicostate, reticulate. Inflorescence is a branched raceme. Flowers are bracteate with 2 bracteoles, unisexual, male flowers towards the base and female towards the apex., complete, heteromereous, actinomorphic, hypogynous in female. Male flowers have a perianth of 4 to 5 lobes, uniseriate, numerous stamens. Female flower's perianth is as in male, tricarpeillary, syncarpous, trilocular, superior ovary with one ovule in each locule on axile placentation. Styles free, each apically bifurcated into 2 feathery stigmas. Ovary wall spinous.

Fruit a sagma.

The plant is a good example of the family, palmately partite leaves and seeds are useful teaching plant materials for the class.

Common name: Castor oil plant.

Arandi or Randi

Flowers - Dec-March, Fruits March to May.

Fig. 102

Ficus benghalensis L. The famous Banyan tree or Bargad well known to everyone, useful to teachers in many ways. Such as the prop roots, serial rootlets for anatomy classes. Leaves as example of typical dicot. leaves and syconous fruits. Evergreen large tree with many aerial roots from branches. Leaves alternate sheathing, orbicular, ovate, obtuse, entire coriaceous, petiolate, sheathing stipules. Receptacles axillary sessile, globose. Male flowers near the mouth of the receptacle. Sepals 4, stamen 1. Female flowers with shorter perianth. Style elongated.

Common name - The Banyan tree Bargad

Flowers - March April Fruit April May.

Fig. 103

Ficus religiosa L. A large glabrous tree with huge canopy. Planted as avenue tree. Leaves are liked by cattle. Self planted on walls. Seed dispersal by birds useful for teachers for leaves being an excellent example of reticulate venation. Veins becoming clear as mesh after the decomposition of epidermal and mesophyll cells. Leaves are orbicular, ovate coriaceous, caudate, acuminate entire, long petioled, stipulate. Receptacle sessile in axillary pairs, globose supported by basal bracts. Male flowers few or absent, sepals three, stamen one.

Common name : Pipal.

Flowers - April-June.

Fig. 104

Ficus repens Willd. A profusely brached creeper spreading on the walls of buildings making a thick tuft of cover. Special, brown, tufts of aerial roots are formed at each internode which hold the walls firmly. The plant is an excellent example of root climber for the teachers. The stem is glabrous, smooth brached, jointed. Leaves are sessile or sub-sessile, ovate or obovate, glabrous, shining on the upper surface dull green on the lower side. Receptacles are comparatively larger, green when unripe, becoming greenish yellow after ripening. Plants can be used as root climber and syconous fruits for teaching.

Fig. 105

Morus alba, L. A cultivated tree in gardens and lawns. deciduous, leaves ovate to lanceolate, acute, acuminate, dentate, serrate, base broader, petiolate. Flowers bisexual, male spikes elongated catkins, female spikes short, ovoid. Fruits white or dark purple when ripe, edible and juicy.

Plants, specially the catkin inflorescence is useful to teachers. Leaves are used to feed the silkworm.

Common name ; The white Mulberry.

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Fig - 106

Casuarina equisetifolia L. A tall avenue tree, fast growing, evergreen without leaves with straight stems and drooping branches. Each branch has long slender deciduous, 6-8, drooping branchlets. Male flowers are monandrous in terminal cylindric spikes and female arranged in small cone like clusters which become woody when ripe. Fruits 2 cm. across with about 12 rows of achenes. Nutlets thin and winged.

Common name Buffwood tree, Vilayatc-Jhau

Flowers - March-May, Fruits June-July.

Fig. 107

CERATOPHYLLACEAE

Ceratophyllum demersum L. An aquatic plant, abundant in still water, slender submerged rootless much branched aquatic weed. Leaves whorled, divided into filiform segments, once or twice bifurcate. Male and female flowers solitary, mon^oecious in separate axils. 6-12 narrow involucre act as perianth. Stamens 10-30, sessile, anthers large, white. In female flowers perianth similar but not 2 fid as in males. Ovary sessile one chambered. Nutlets ovoid or ellipsoid small.

Flowers fruits after rains throughout the year.

Plants can be used as substitute to Hydrilla

In photosynthesis experiments.

Fig. 108

MONOCOTYLEDONES

AMARYLLIDACEAE

Crinum sp. A cultivated garden plant in pots or in flower beds. When grown in flower beds, it becomes stout with large leaves. Bulb is ovoid. Leaves are erect, concave, large, glabrous, ensiform and acuminate. Flowers white large in umbels on a large, stout scape. Perianth tube almost equal to the lobes. Very near in characters to crinum defixum ker-Gawl.

Flowers- July to October.

Fig. 109.

LILIACEAE

Allium cepa L. Cultivated herb with a tunicated bulb; large bulbs, leaves subdistichous, fistular, radical. Flowers many, greenish white, in dense umbels with flowers and bulbils surrounded by 2-3 reflexed bracts. Pedicels short, stamens exerted. Flowers trimereous, bisexual complete. A good example of bulb and fistular leaves.

Flowers : Winter season.

Common name: The onion, Pyaq.

Fig. 111

Allium sativum L. Bulbs short, compressed with small bulblets enclosed in white membranous covers. Leaves flat. Flowers often displaced by bulbils, white or pinkish in umbels on long scape, flowers small, complete trimereous, perianth biseriata. Sepals lanceolate acuminate.

Flowers - cold season.

Common name - The garlic Lahaun

Fig. 110

COMMELINACEAE

Commelina benghalensis L. A fairly ^{Common} annual in open and shady places. Sometimes found on garden walls. Plants are diffuse or straggling, dichotomously branched herb. Stems usually creeping, soft and rooting at lower nodes. Leaves ovate to sub-orbicular, acute to obtuse, caudate or cordate at the base. Aerial spathes 1-3 in the axils, funnel shaped. Flowers dimorphic, aerial ones blue or bluish violet. Upper cyme is 2-3 flowered while the lower cyme 1-2 flowered. Sepals small, petals unequal larger orbicular or oblong. Ovary 3 celled. 2 chambers 3 ovulate and one chambered one ovulate. Capsules pyriform, 5 seeded. Cleistogamous, underground flowers white, solitary in a pear shaped spathe, and fruits are abundant on many of the lower nodes which ripen into large seeds.

Plants are useful to teachers for the demonstration of Aerenchyma, monocotyledonous stem, spathe, trimerous flowers and cleistogamous flowers.

Flowers fruits-Aug-Nov.

Fig. 112

Commelina forskalii vahl. A straggling diffuse herb found in shades of shrubs, branched stems are slender with glabrous, linear leaves. Aerial flowers chasogamous, underground cleistogamous. Spathes 3-5 flowered. Petals sky blue, 3 larger obovate, with a very slender and long claw. Filaments very long, spirally coiled. Capsule usually 3 seeded. Cleistogamous flowers usually one in spathe, bisexual, Capsule one seeded.

Flowers fruits Aug-Nov.

Fig. 113

ARACEAE

Colocasia sp. - Leaves peltate, moderately large, stout petioles. Spathe caudate, acuminate, erect, ^ayellow. Spathes petaloid rarely seen in flowering.

Fig. 114

Pistia stratiotes L. Found in ponds and water tanks. A floating stoloniferous plant. Roots of tufted white fibres, leaves variable densely pubescent on both the surfaces. Plants are useful for the teachers for the demonstration of aerenchyma, spongomesophyll and offset (a modification of stem)

Common name - The water soldier.

Fig. 115

POTAMOGETONACEAE

Potamogeton indicus Wxrb. A floating herb found in marshy places. The plant is brownish in colour. Stem is branched smooth. The branches below are creeping. Leaves petiolate, lower submerged ones are very thin while floating ones are alternate or opposite. Flowers in spikes, sessile.

Flowers - in cold and
fruits in hot seasons.

Fig. 116

CYPERACEAE

Cyperus alopecuroides Retth. Plants are herbaceous, commonly found along streets, silty and sandy soils. Roots are numerous, fine, tufted. Rhizomes are absent. Stem erect and diffuse. Leaf blades almost linear, acuminate tip. Spikelets in condensed umbellate spikes.

Flowers July-Dec.

Fig. 117

Cyperus triceps (Retth.) Endle.

A glabrous, erect herb with single 3 angled stem. Leaves linear, flat. Umbel simple.

Flowers - Aug to Feb.

Fig. 118

GRAMINEAE (POACEAE)

Avena sativa L. Cultivated crop plant. Erect annual with expanded leaves. Panicles effuse. spikelets pendulous, all alike 2-4 flowered, rachilla and lemmas glabrous. Upper lemmas awn less. Lodicules usually 2, stamens 3, styles 2, free. Ovary tip villous.

Common name - The oats, Jai.

Fig. 119

Chloris delichostachya Lagasca.

A tufted erect grass. Much branched below leaves linear, ciliate leaf sheaths, short, ligulate, ligules hairy, spikes in clusters. Rachis minutely hairy. Spikelets with 4 glumes. Upper ones awned.

Flowers Sept-Nov.

Fig. 120

Cynodon dactylon (L.) Pers. A perennial grass with prostrate creeping stem rooting at the nodes. Culms form matted tufts leaves linear, acuminate, spikes digitate, green or purplish, spikelets one flowered. In 1-2 series on 3-5 spreading finger like one sides spikes. Lemma one.

Common name - Bermuda grass, Doob

Flowers - Throughout the year.

Fig. 121

Setaria glauca (L.) Beauv. This grass is very common on cultivated grounds as weeds. Becomes very troublesome during rainy seasons as the plants are in flowering stages. Syn. Panicum glaucum L. It is an annual, erect and tufted grass. Culms are simple or branched. Leaves linear-lanceolate, very fine tapered spines on the leaves. Panicles cylindric, 3-10 cm long, usually yellow. Bristles 6-12. Spikelets 2 flowered, lower male or barren, upper hermaphrodite; fertile florets with numerous ridges. K

Common name: Foxtail grass

Banandari grass

Flowers - July to Oct.

Fig. 112

Triticum aestivum L.

Famous wheat plant extensively cultivated throughout the country for wheat grains. It is an erect tufted annual grass. Leaves linear, lanceolate flat and acuminate. Spikes erect or curved, compact. Spikelets solitary, laterally compressed 3-5 flowered. Involucral glumes with short awns. Floral glumes without awns or 1-3 awned. bisexual, stamens 3, lodicules 2, styles-2. Seeds oblong ventrally grooved.

Common name - Wheat plant, Gehu

Flowers - fruits - Jan-March.

Fig. 123

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RANUNCULACEAE



Fig. 1 Delphinium ajacis L.

RANUNCULACEAE



Fig. 2 Nigella sativa L.

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Information

MOGNOLIACEAE



Fig. 3 Michelia champaca L.

ANNOUNACEAE

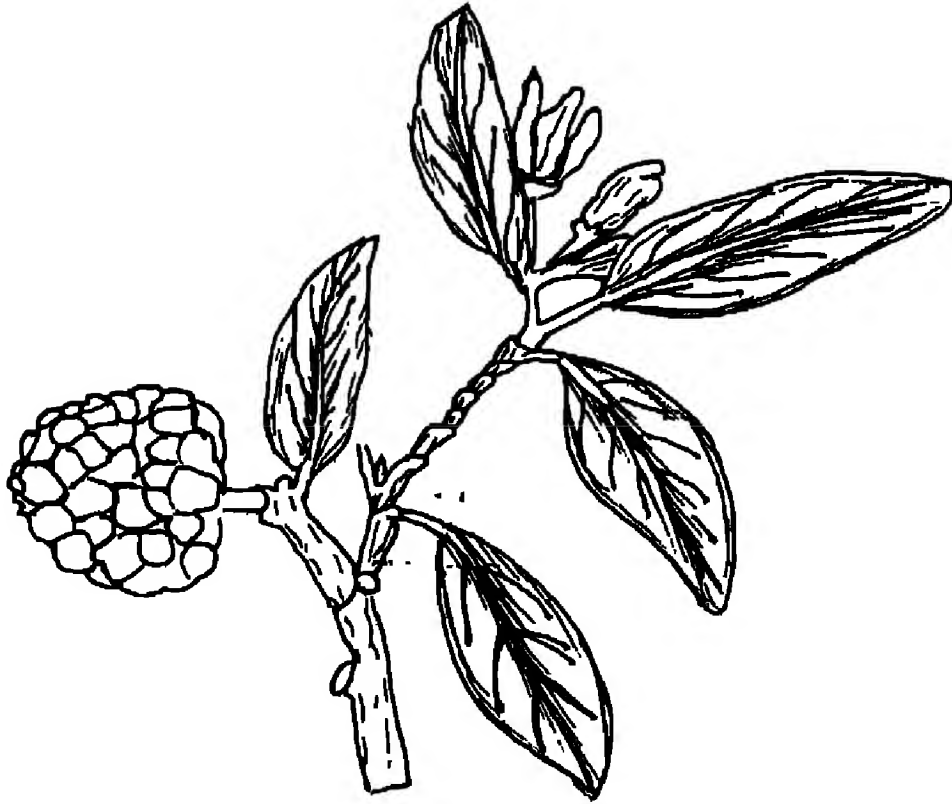


Fig. 4 Annona squamosa L.

ANNONACEAE



Fig.5 Polyalthia longifolia Thw. Enum.

PAPAVERACEAE

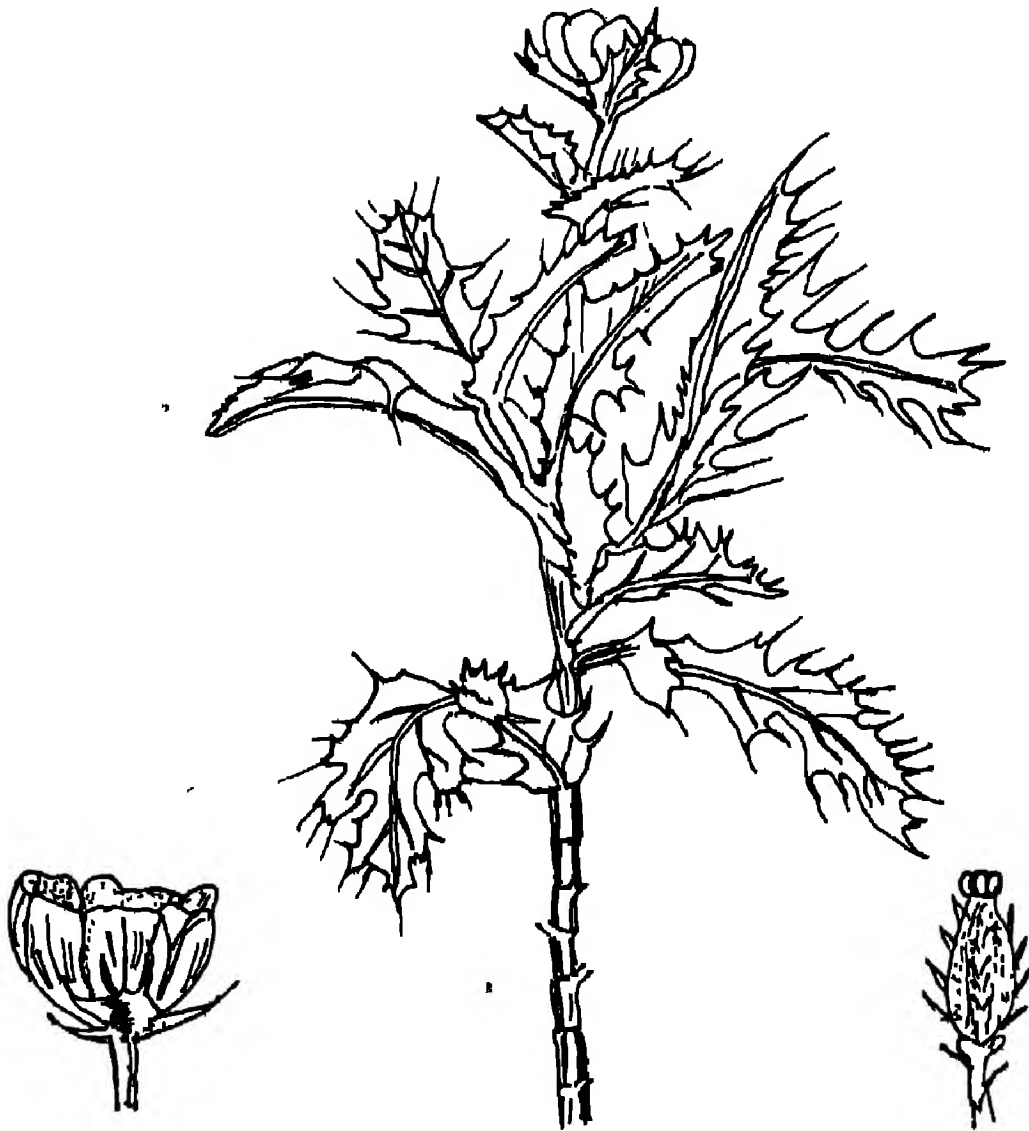


Fig. 6 Argemone mexicana L.

PAPAVERACEAE



Fig. 7 Papaver rhoeas L. var. latifolia

FUMARIACEAE



Fig. 8 Fumaria indica (Hornemann) Pugsley.

BRASSICACEAE



Fig. 9 Brassica campestris L. Var. Sarson.

VIOLACEAE

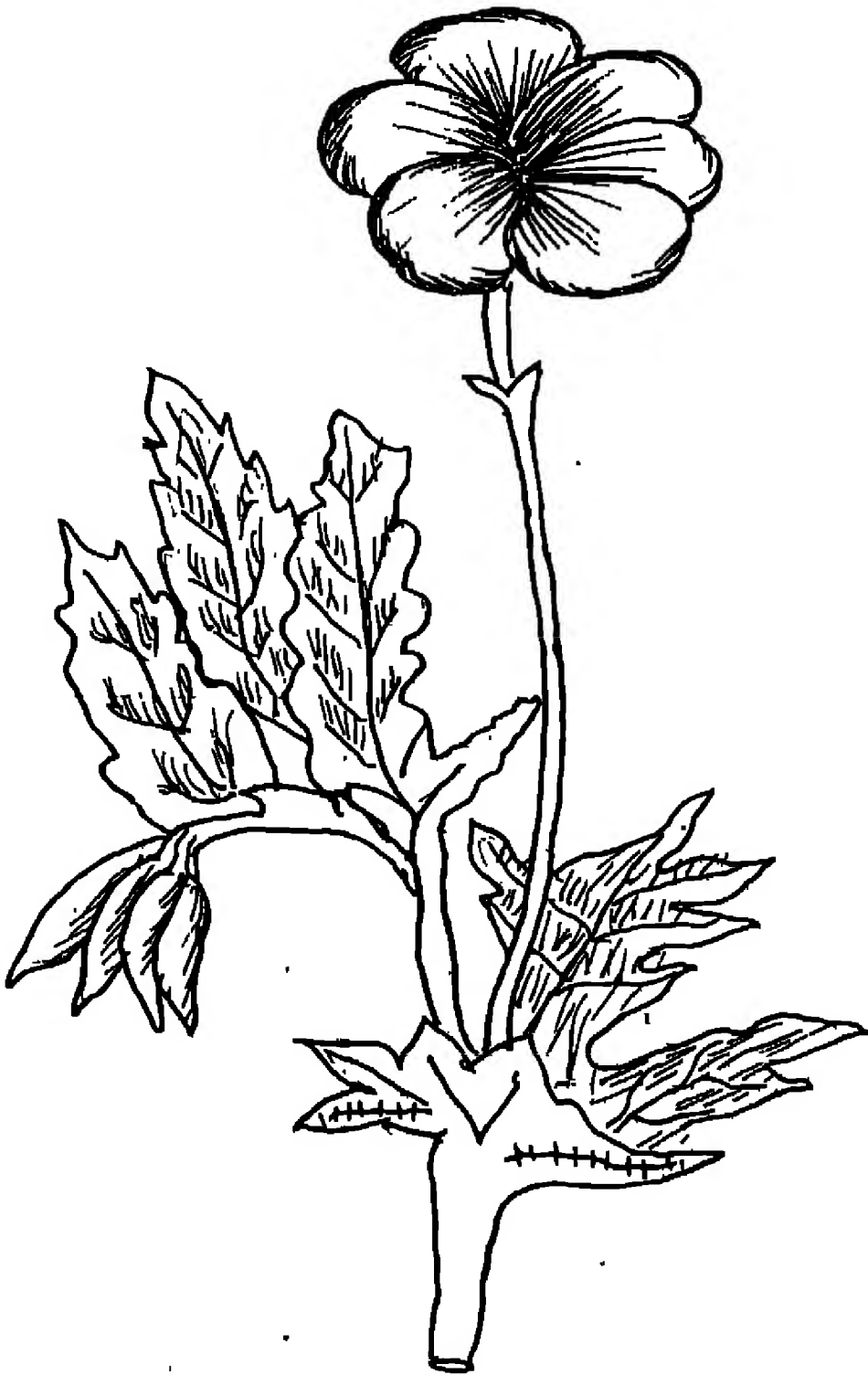


Fig. 40 Viola tricolor L.

CARYOPHYLLACEAE



Fig.|| Dianthus caryophyllus L.

CARYOPHYLLACEAE



Fig-12 Silene conoidia

PORTULACACEAE

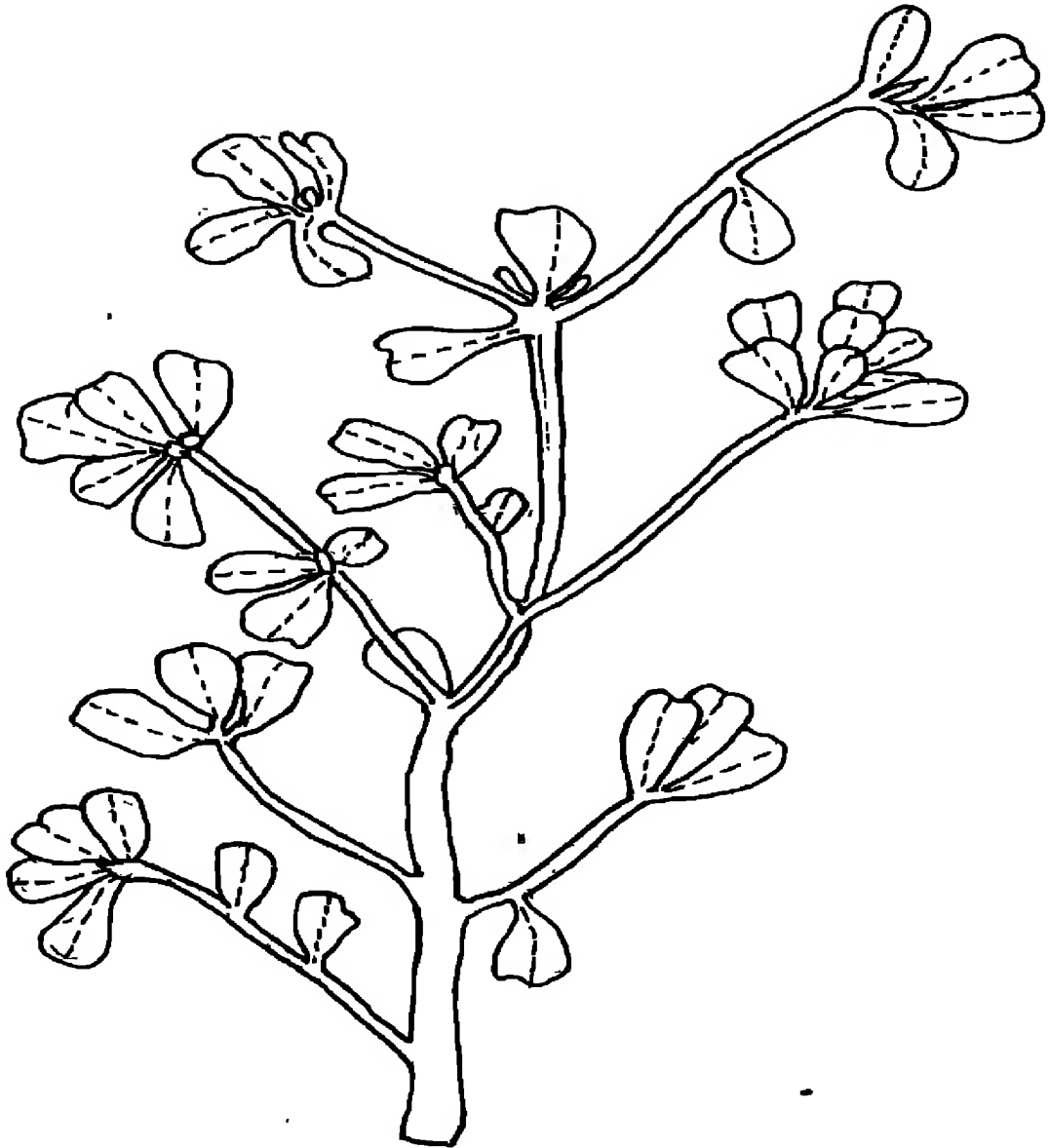


Fig - 13 Portulaca quadrifida L. .

MALVACEAE

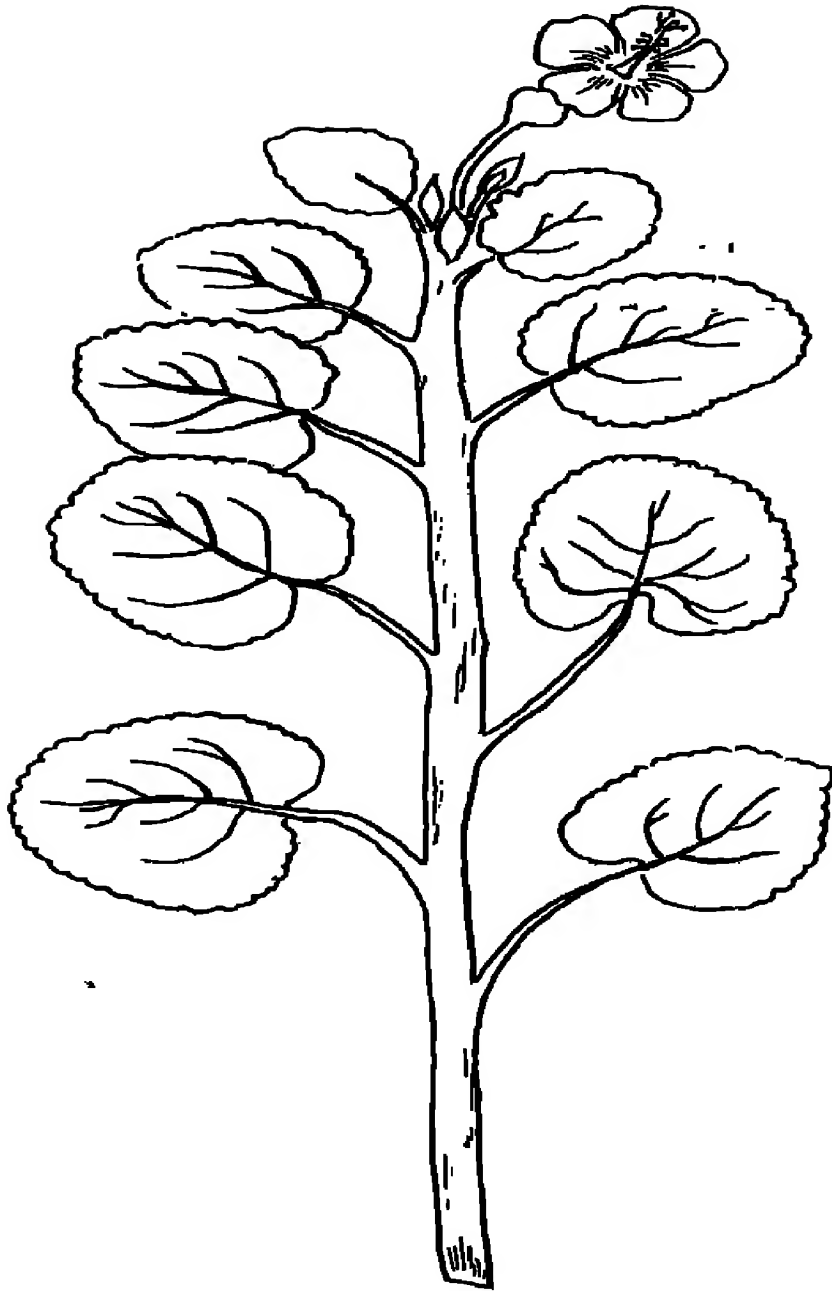


Fig. 14 Abutilon indicum (L) Sw.

MALVACEAE



Fig. 15 Gossypium hirsutum L.

MALVACEAE

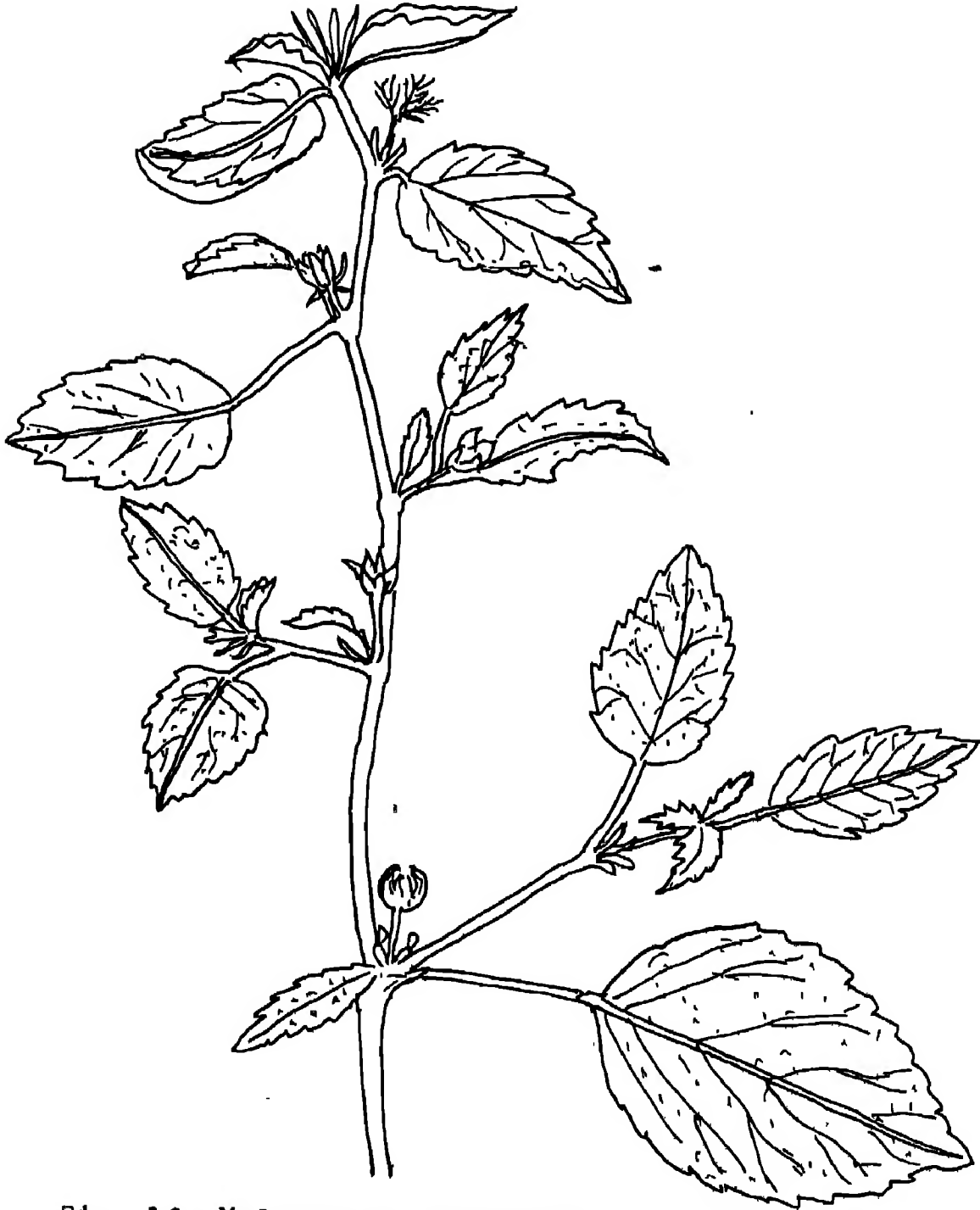


Fig. 16 Malvastrum coromandelianum (L.) Gaycke.

MALVACEAE



Fig. 17 Sida cordifolia L.

TILIACEAE

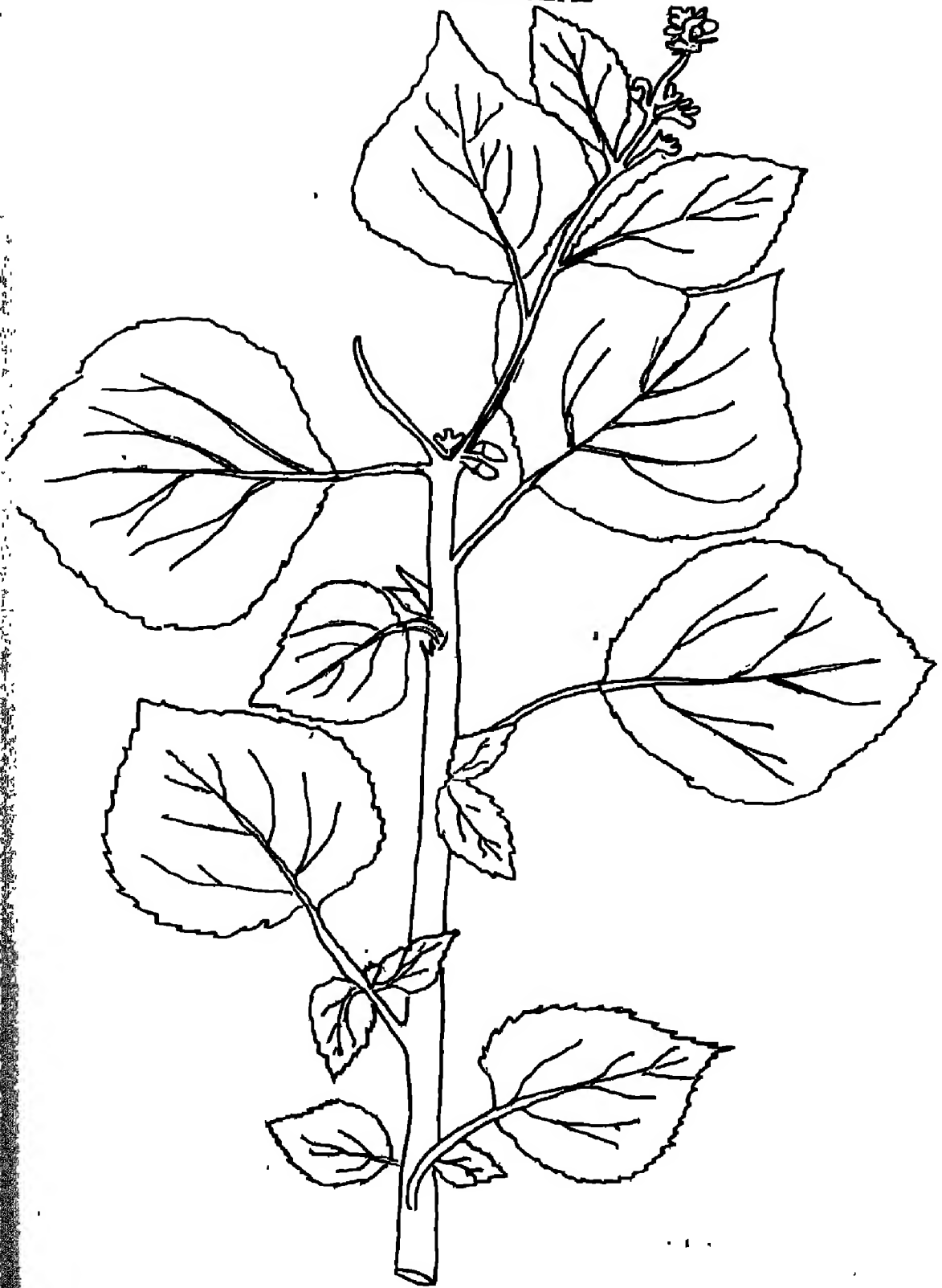


Fig. 18. Corchorus aestuans L.

TILIACEAE

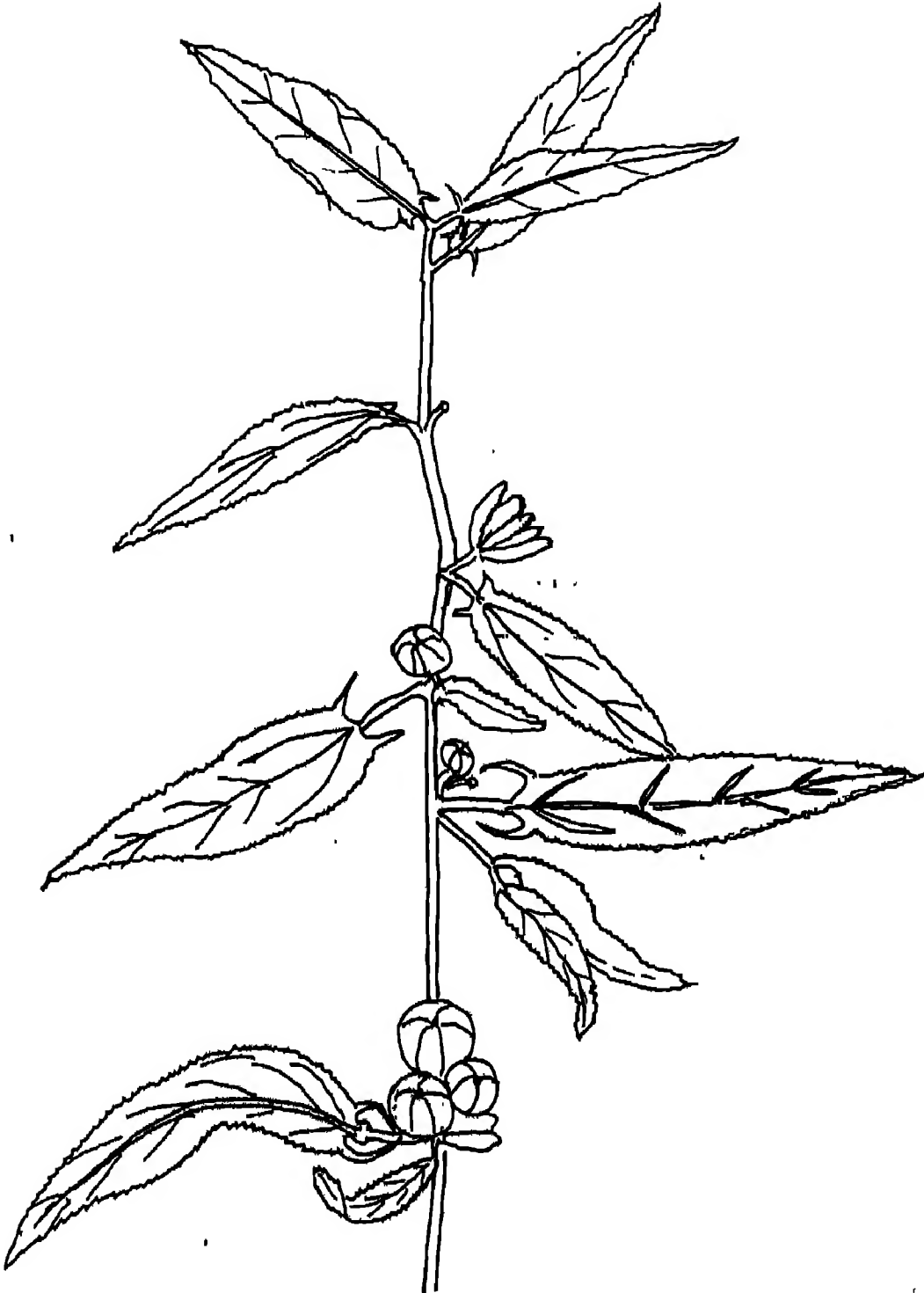


Fig. 19 Corchorus capsularis L.

TILIACEAE



Fig - 20 Corchorus trilocularis L.

LINACEAE



Fig. 21. Linum usitatissimum L.

OXALIDACEAE

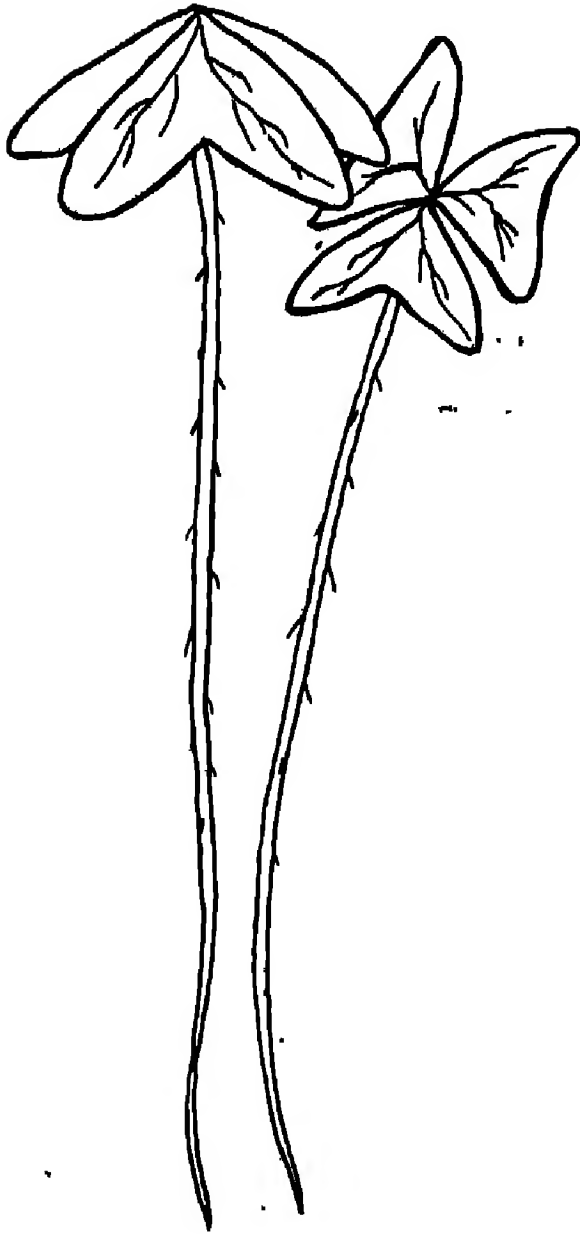


Fig. 22 Oxalis latifolia H.B & K.

TROPAEOLACEAE

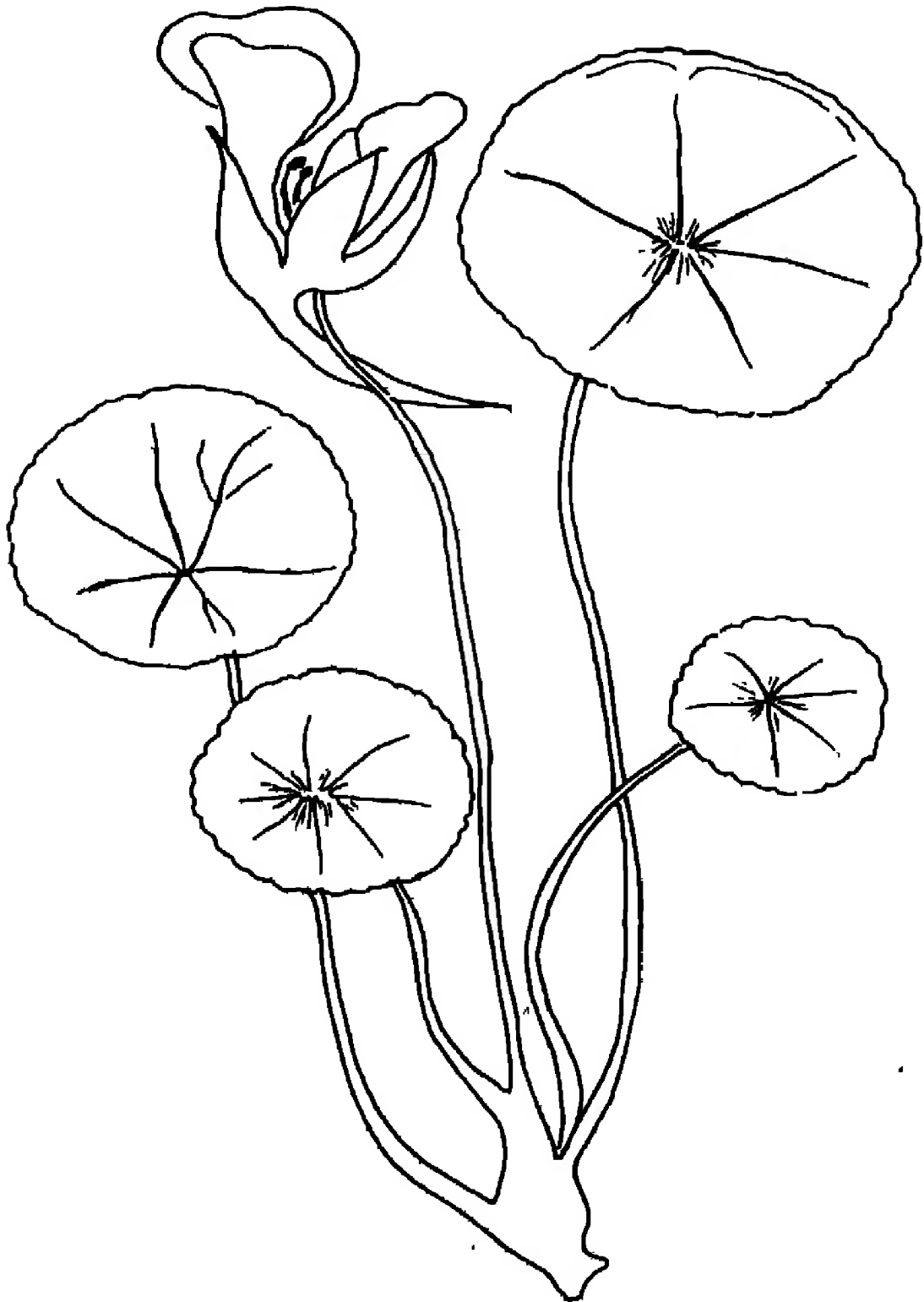


Fig. 23 Tropaeolum majus L.

RUTACEAE



Fig. 24 Citrus limon (L)' Burm.

MELIACEAE

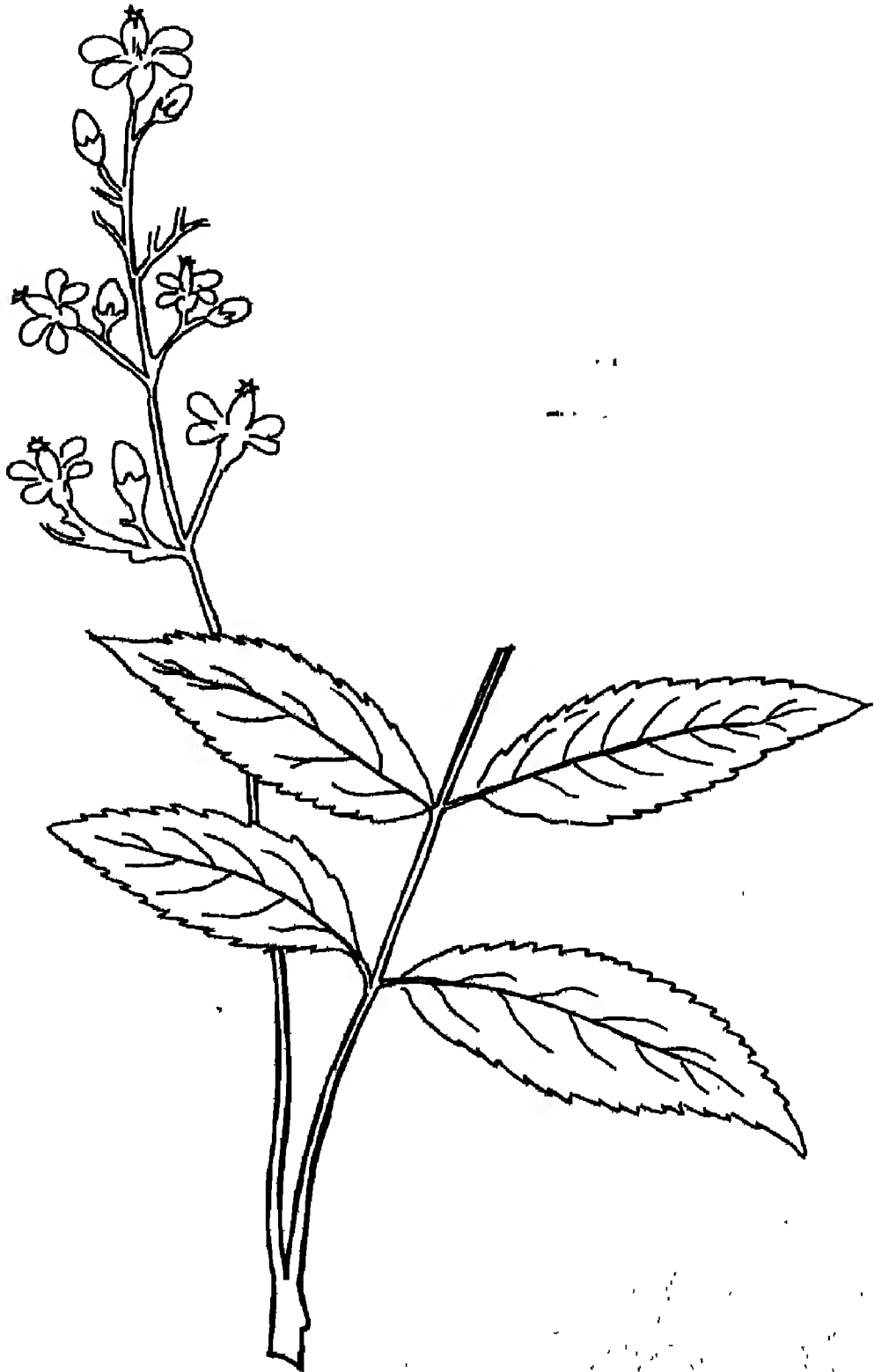


Fig. 25. Azadirachta indica A.Juss.

RHAMNACEAE

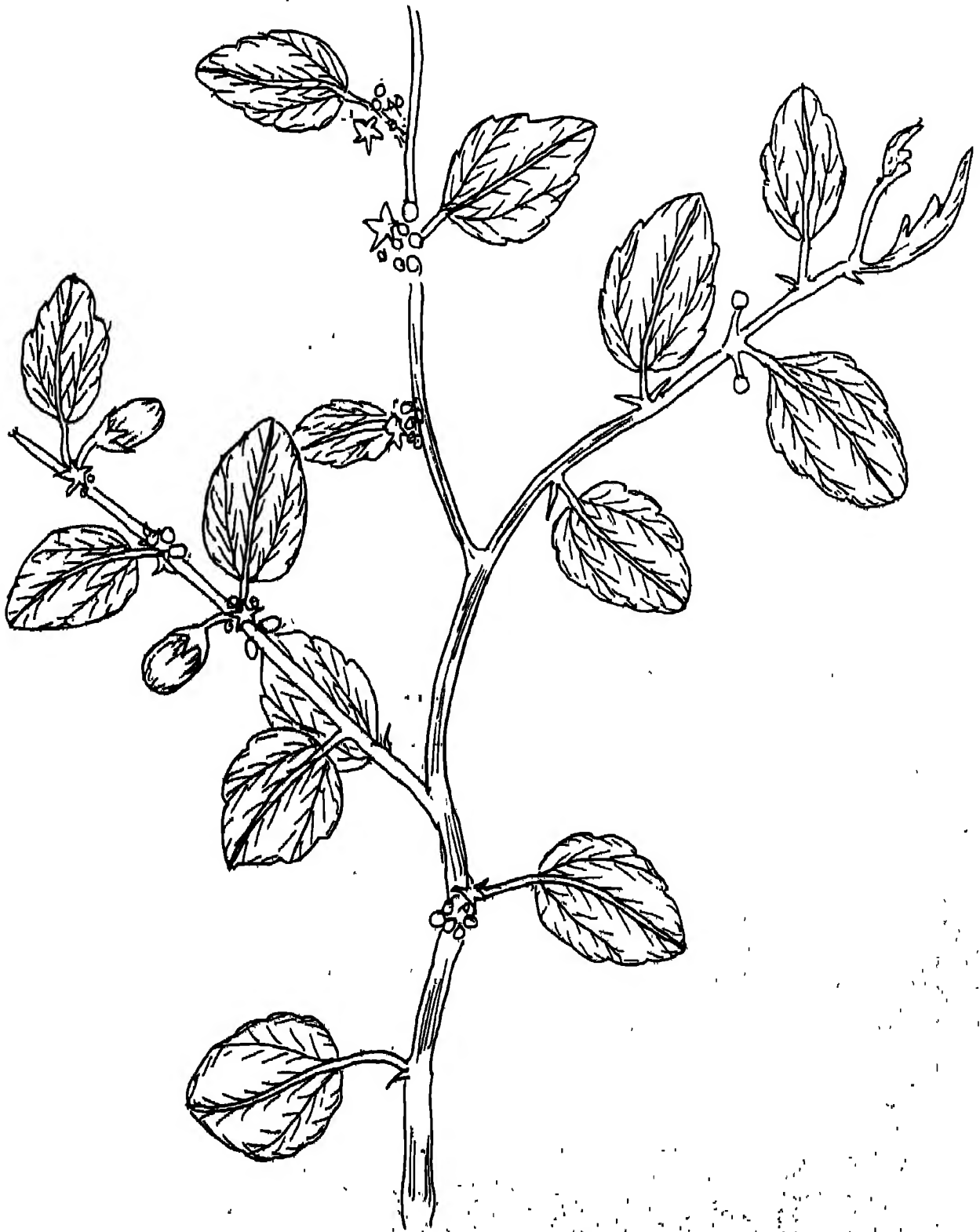


FIG. 26 Zizyphus mauritiana. Lam.

RHAMNACEAE

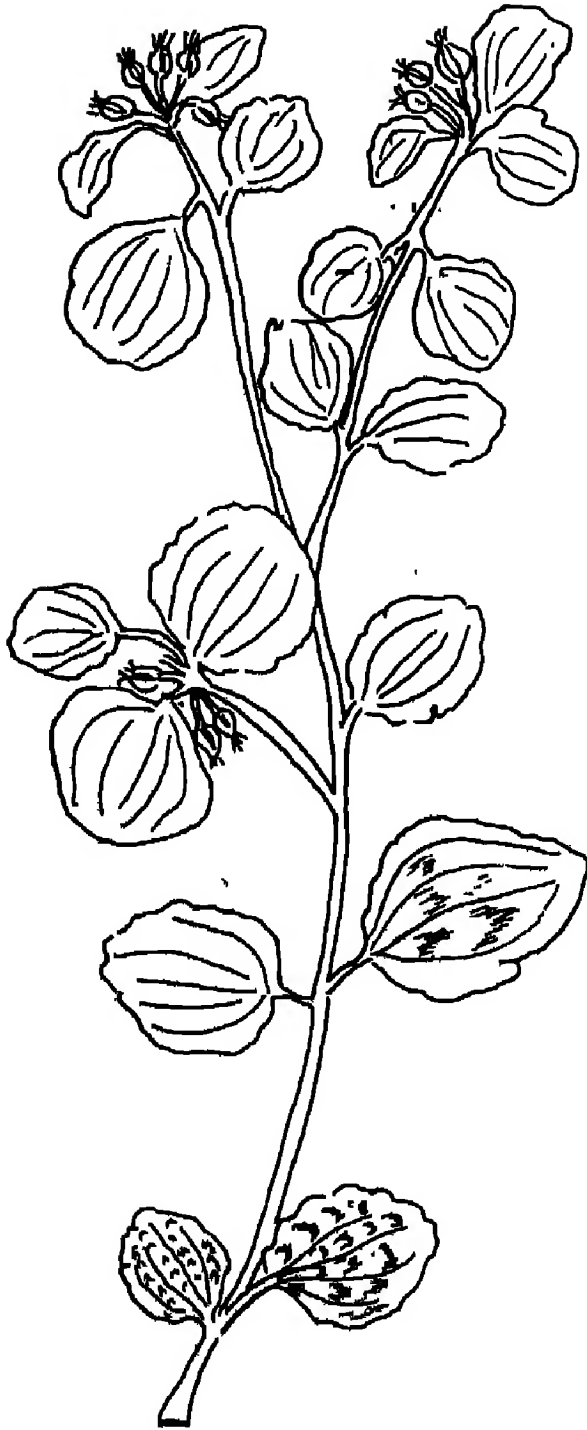


Fig. 27. Zizyphus nummularia (Brum F.) Wt. & Arn.

ANACARDIACEAE

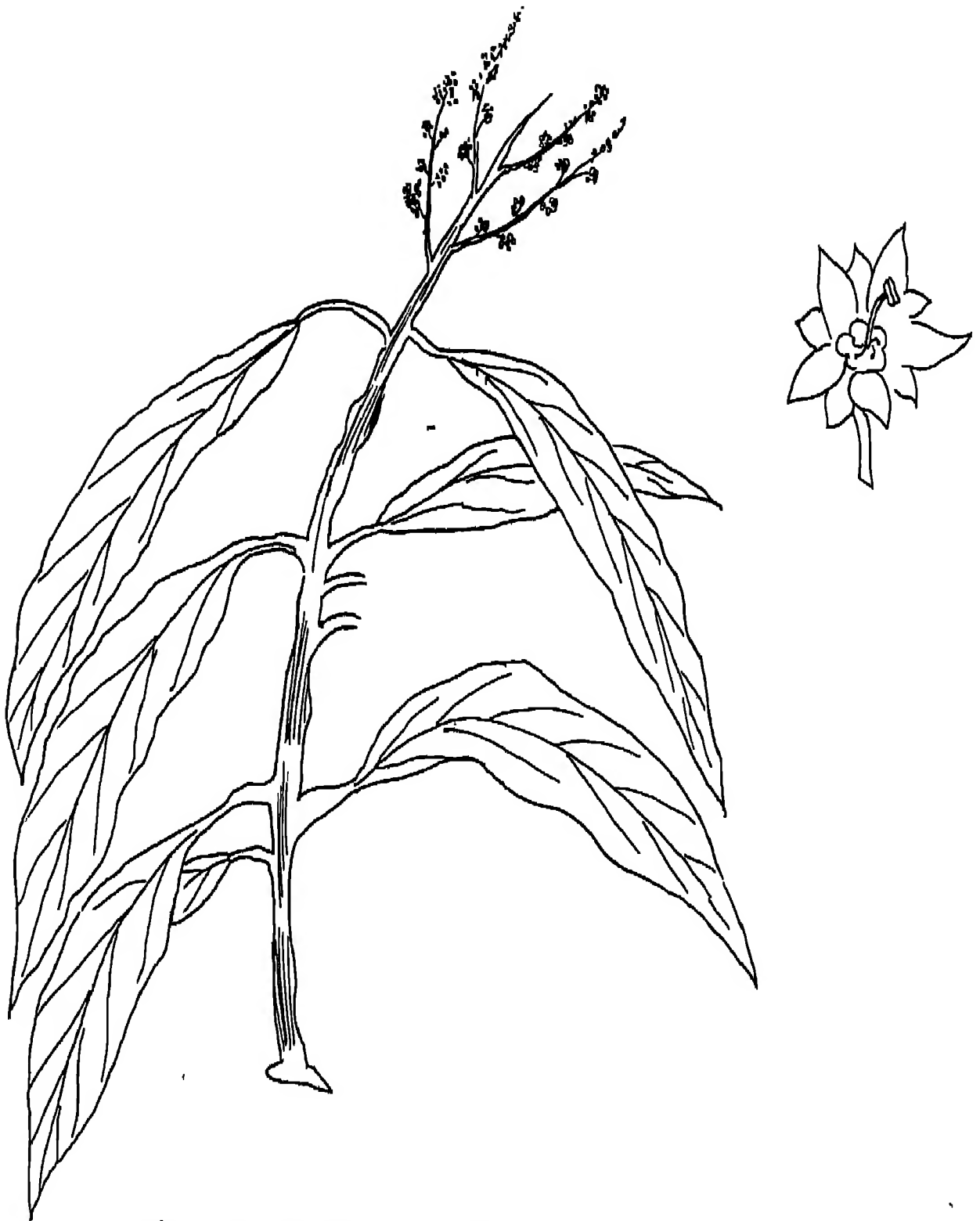


Fig. 28. Mangifera indica L.

MORINGACEAE

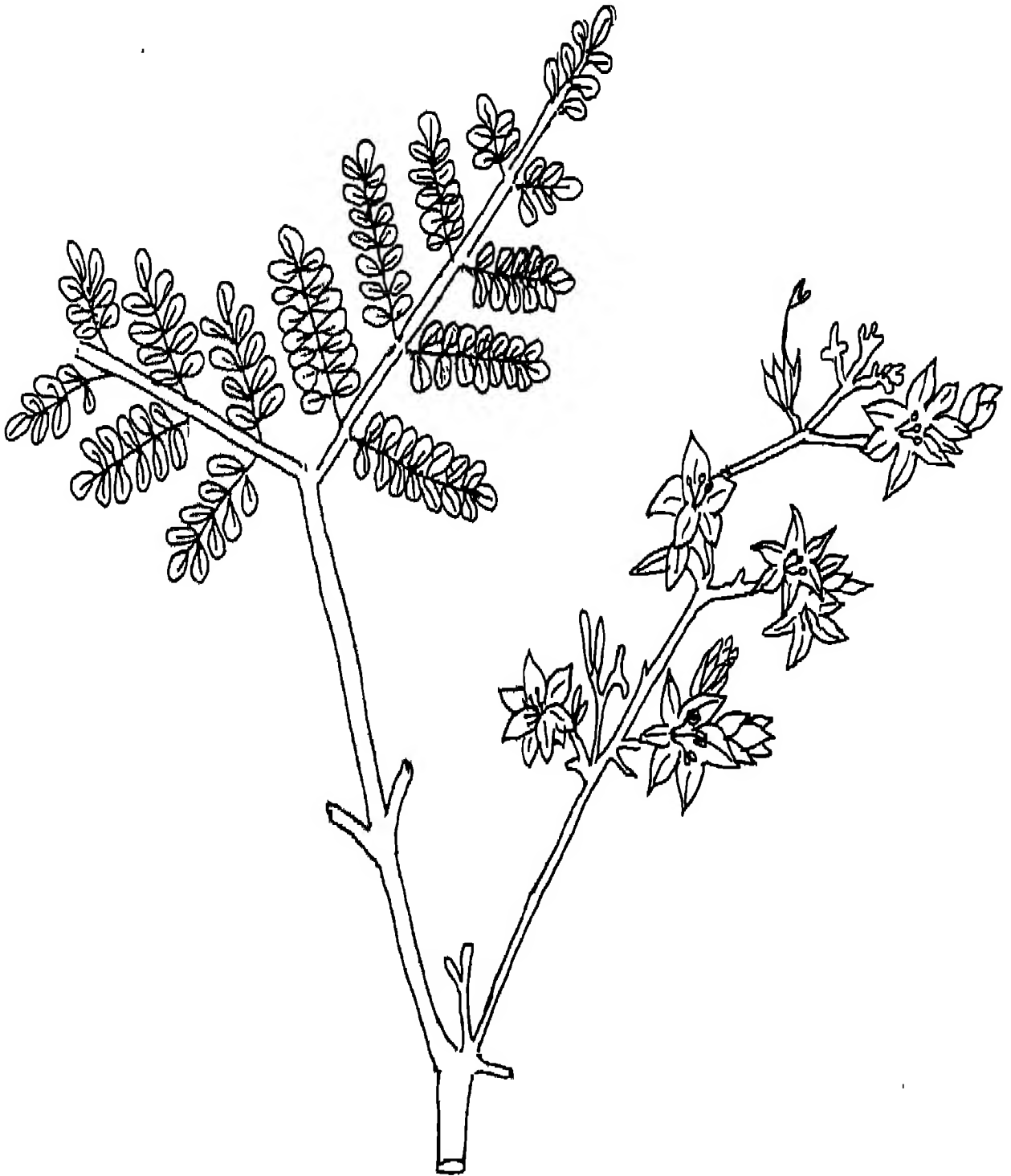


Fig. 29. Moringa oleifera Lam.

PAPILIONACEAE



Fig. 30. Abrus precatorius L.

PAPILIONACEAE

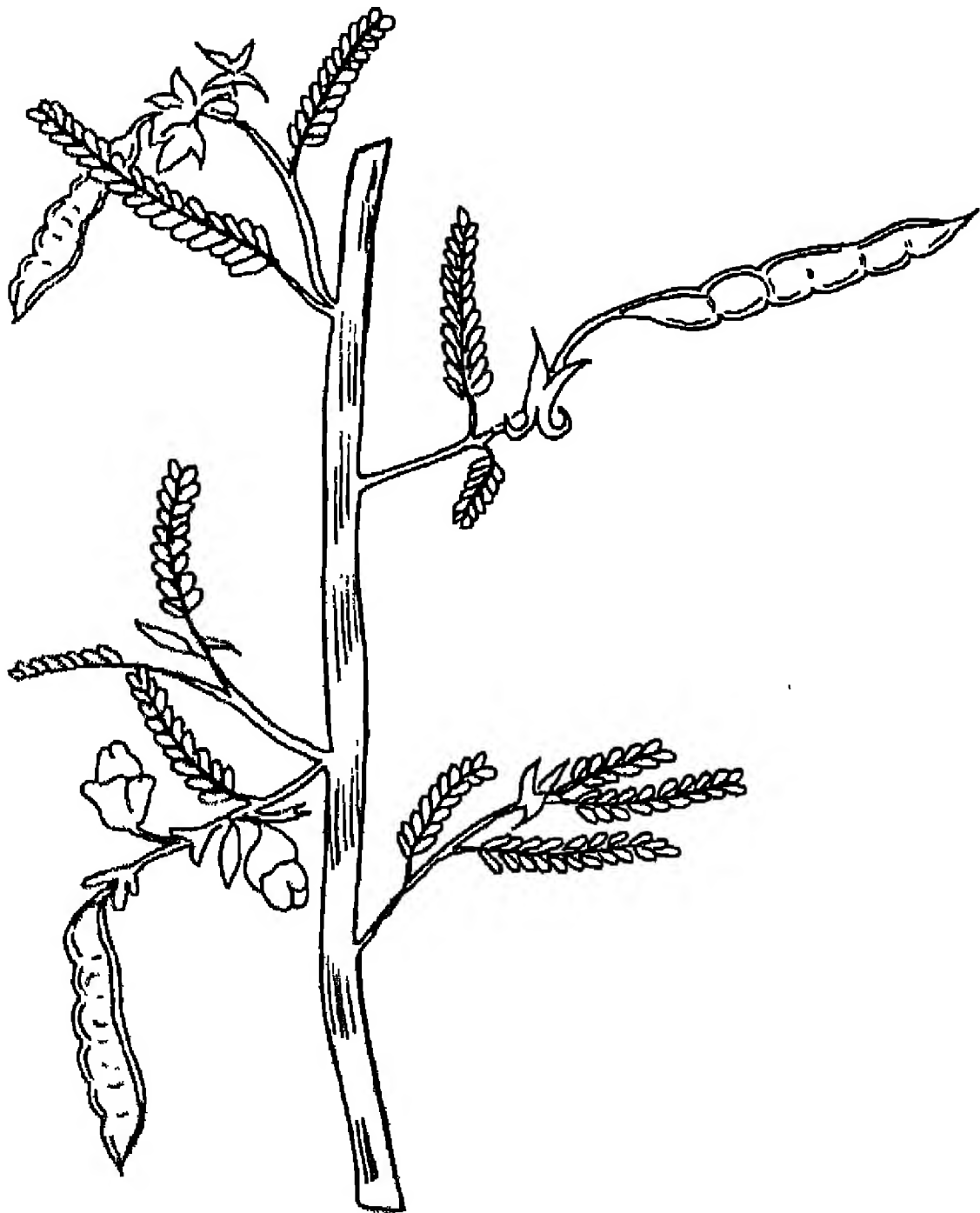


Fig. 31. Aeschynomene indica Linn.

PAPILIONACEAE



Fig. 32 Alysicarpus bupleurifolius DC.

PAPILIONACEAE

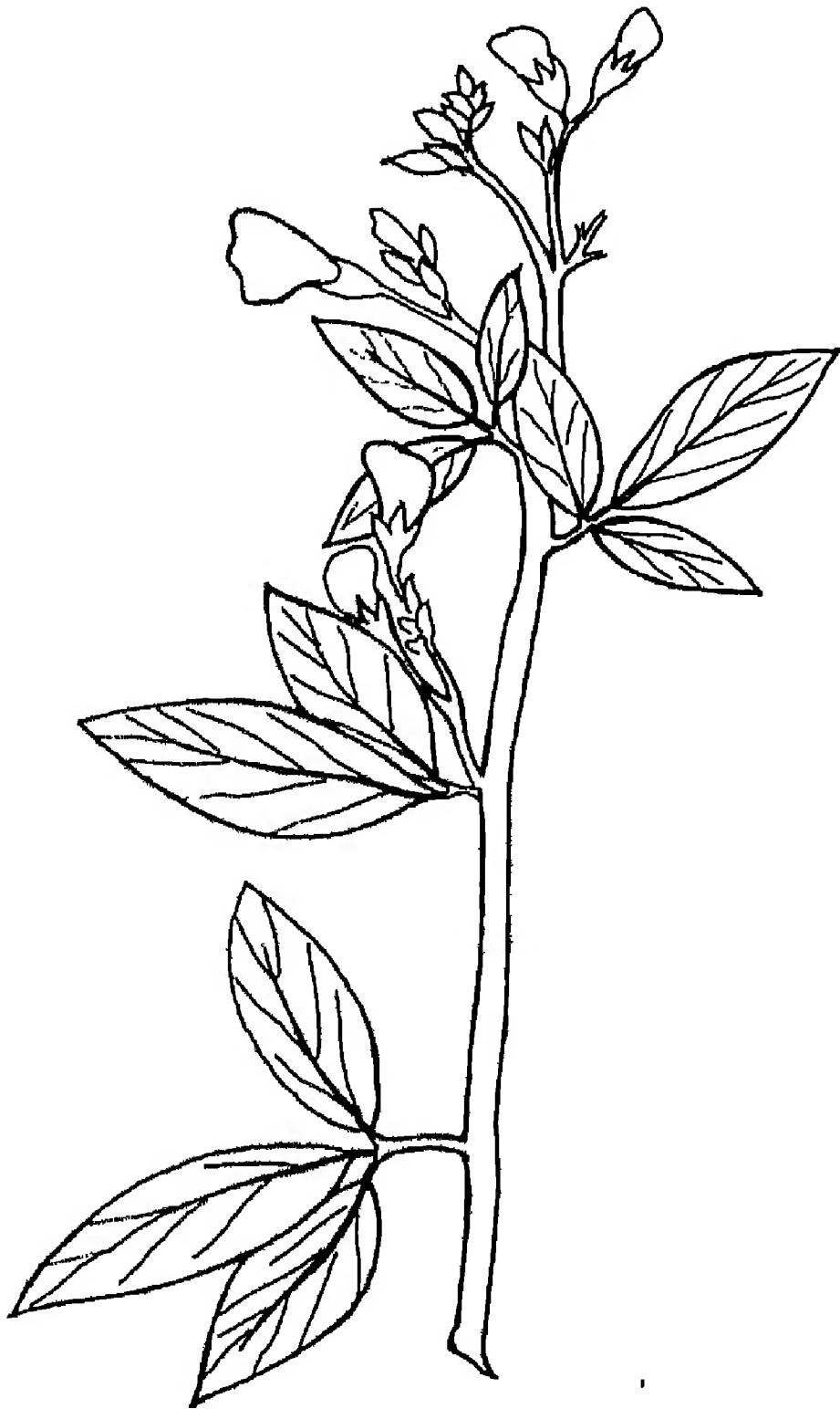


Fig. 33. Cajanus cajan (L) Millsp.

FAPILIONACEAE

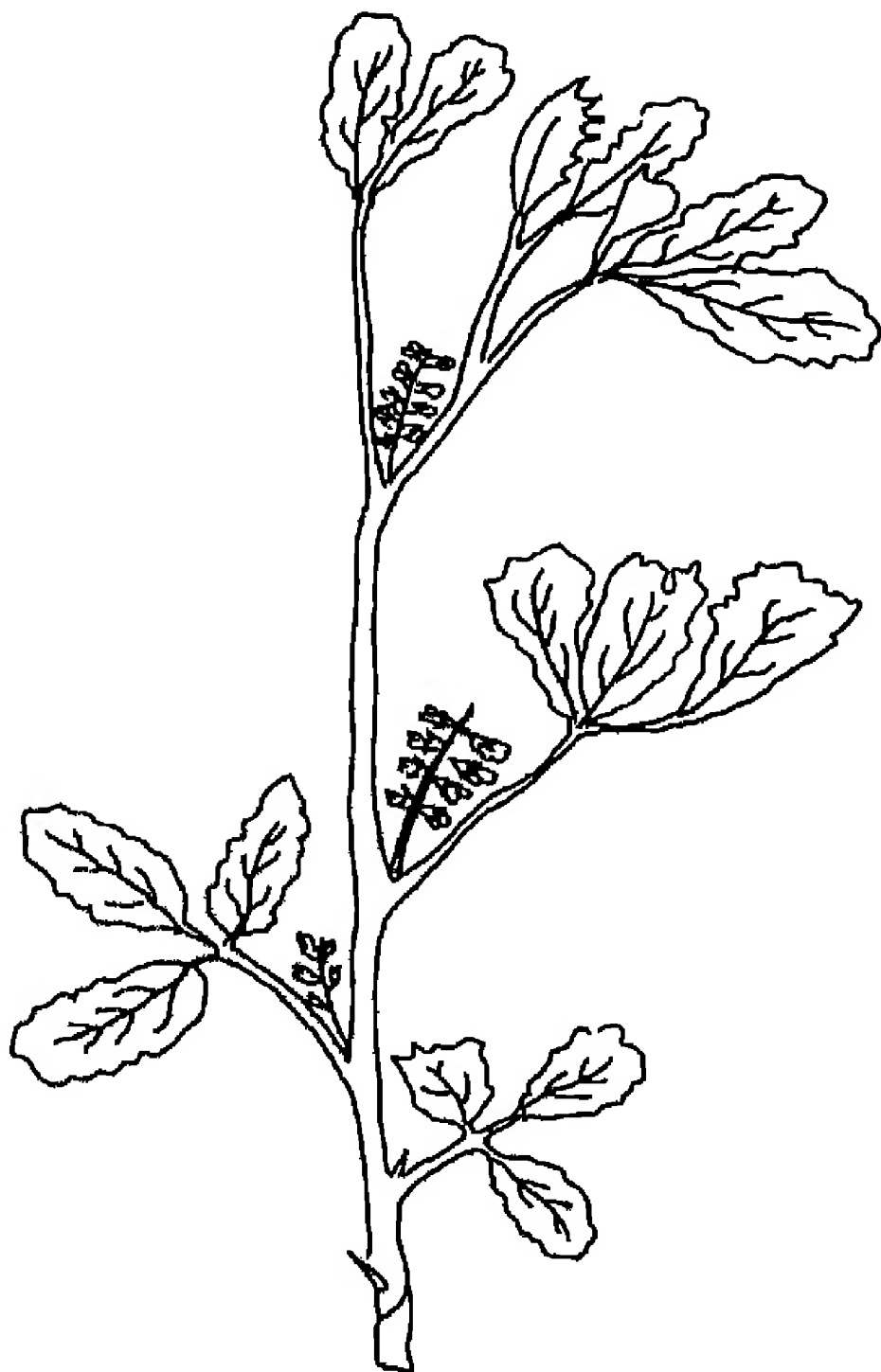


Fig. 34. Melilotus indica All.

PAPILONACEAE



Fig. 35. Tephrosia purpurea (L) Pers.

PAPILIONACEAE

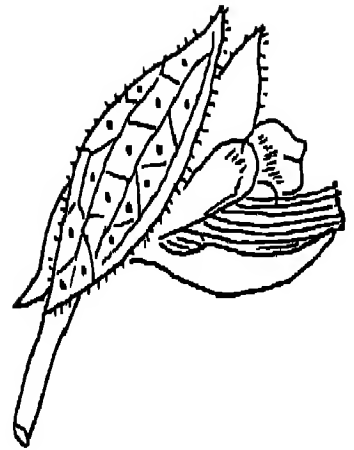


Fig. 36 Zornia gibbosa Span.

CAESALPINIACEAE



FIG. 37 Cassia obtusifolia L.

CAESALPINIACEAE

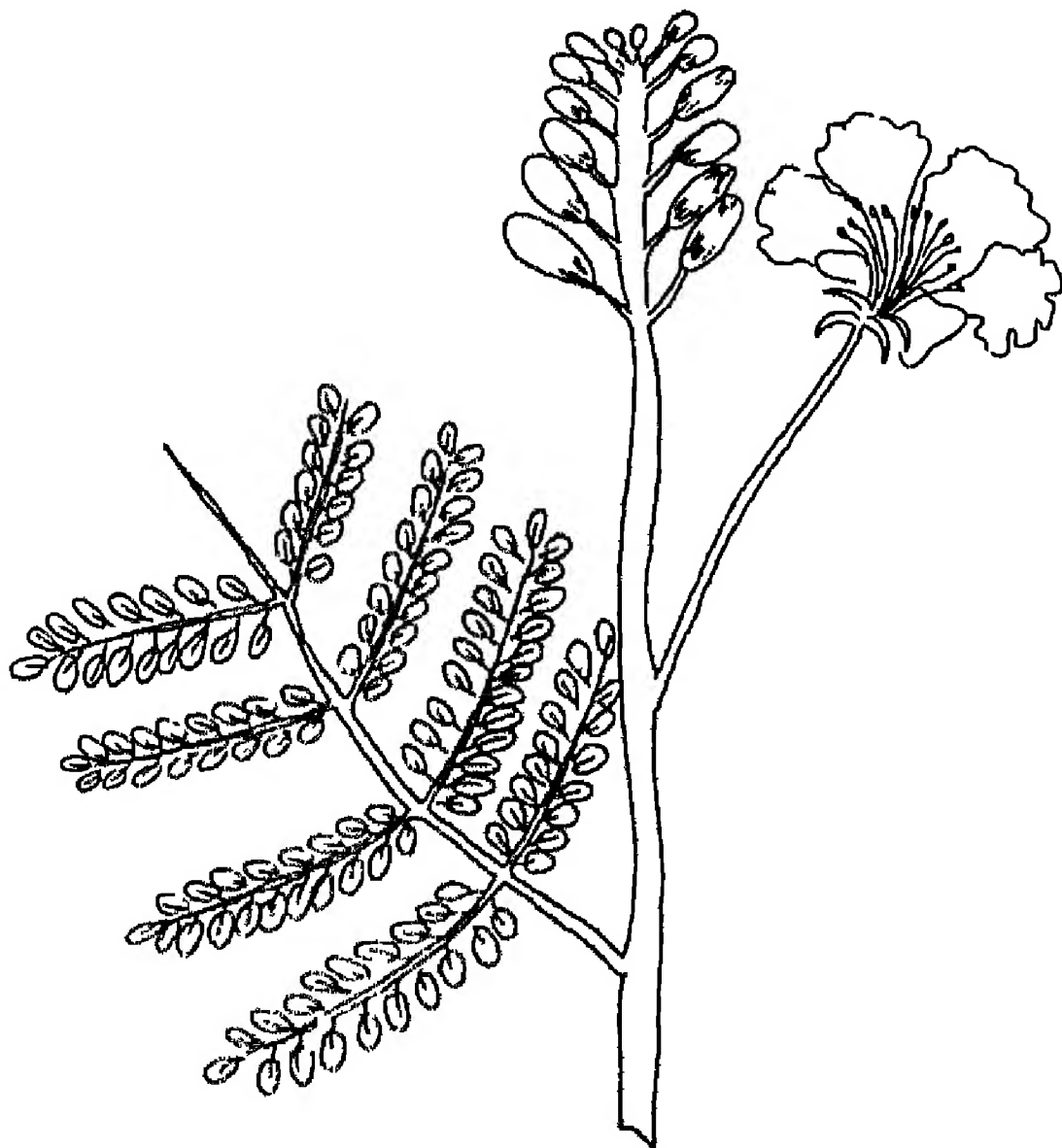


Fig. 38. Poinciana pulcherrima L.

CAESALPINIACEAE

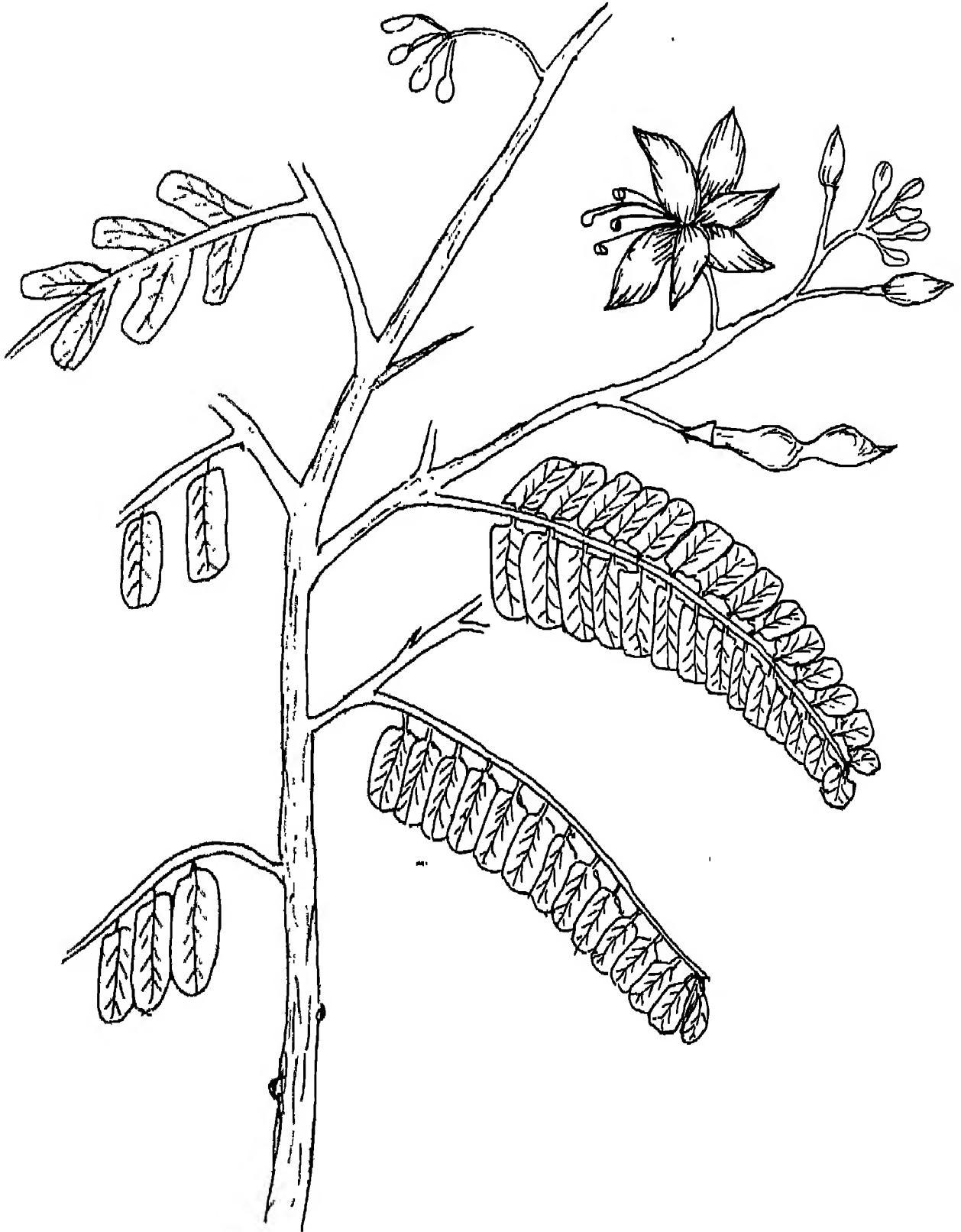


Fig. 39 Tamarindus indica L.

MIMOSACEAE



Fig. 40 Acacia auriculiformis A. Cunn.

MIMOSACEAE

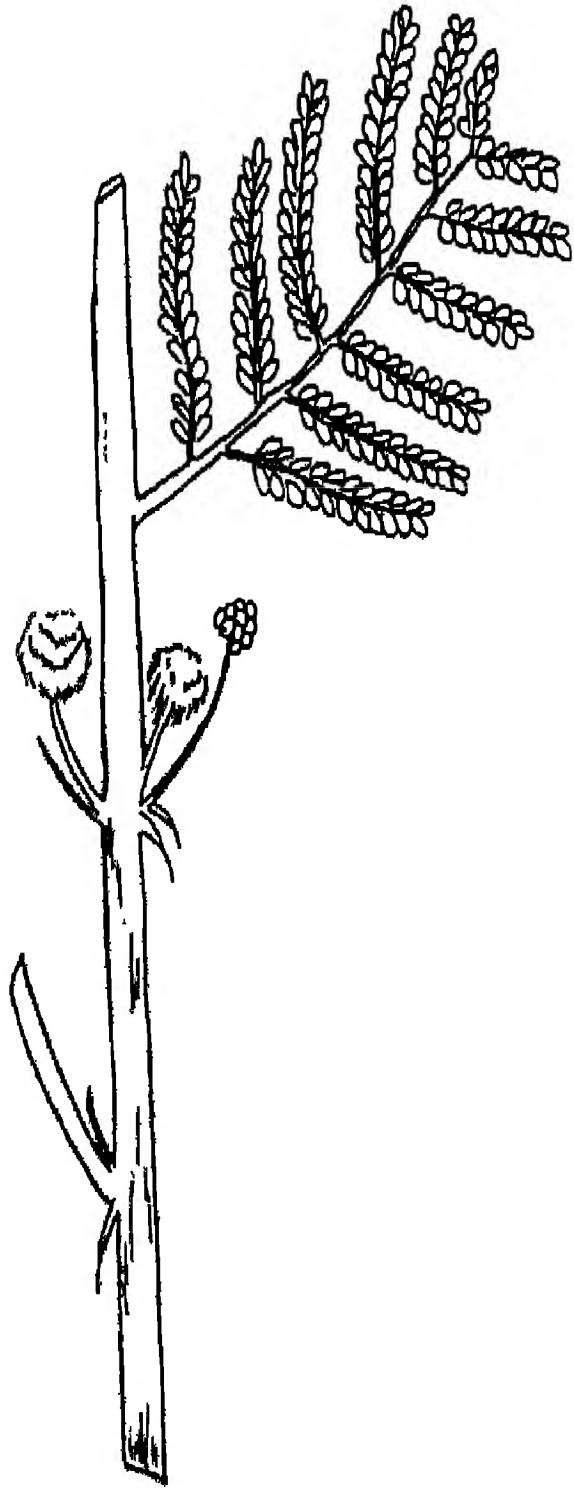


Fig. 41. Acacia nilotica (L.) Del. Subsp. indica (Benth.)

MIMOSACEAE

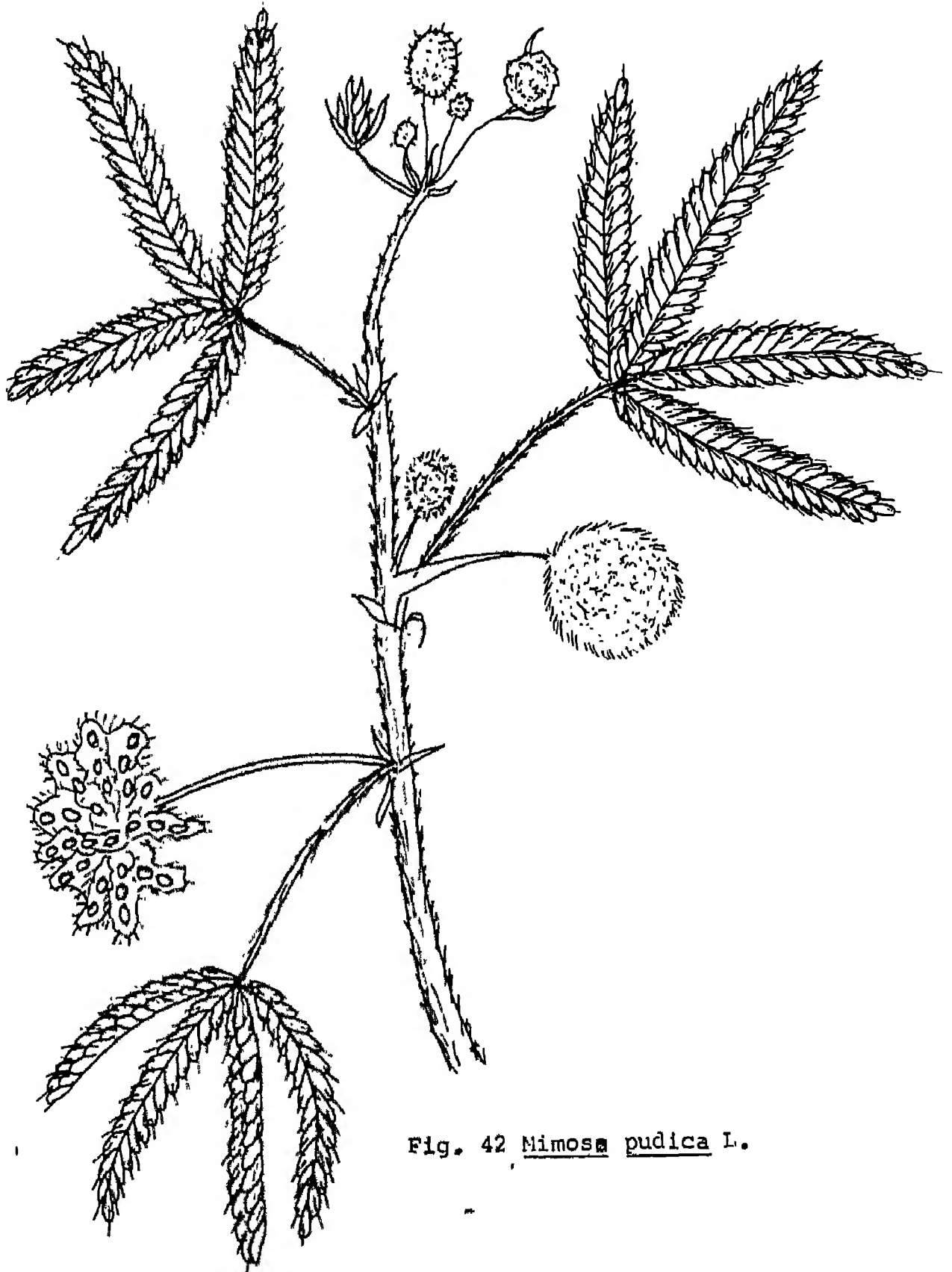


Fig. 42 Mimosa pudica L.

CRASSULACEAE

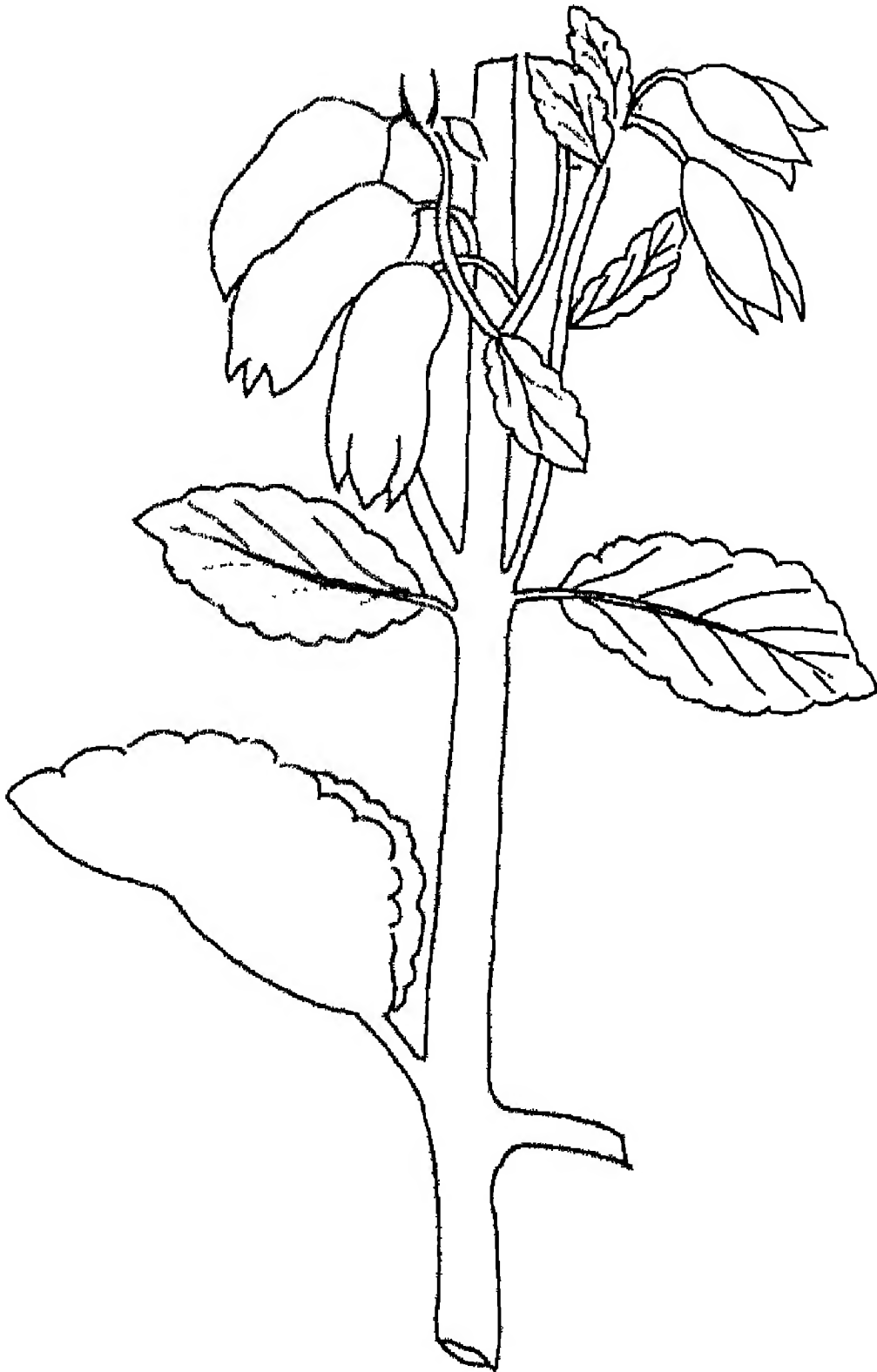


Fig. 43 Kalanchoe pinnata (Lam.) Pers.

MYRTACEAE



Fig. 44 Callistemon lanceolatus D.C.

MYRTACEAE

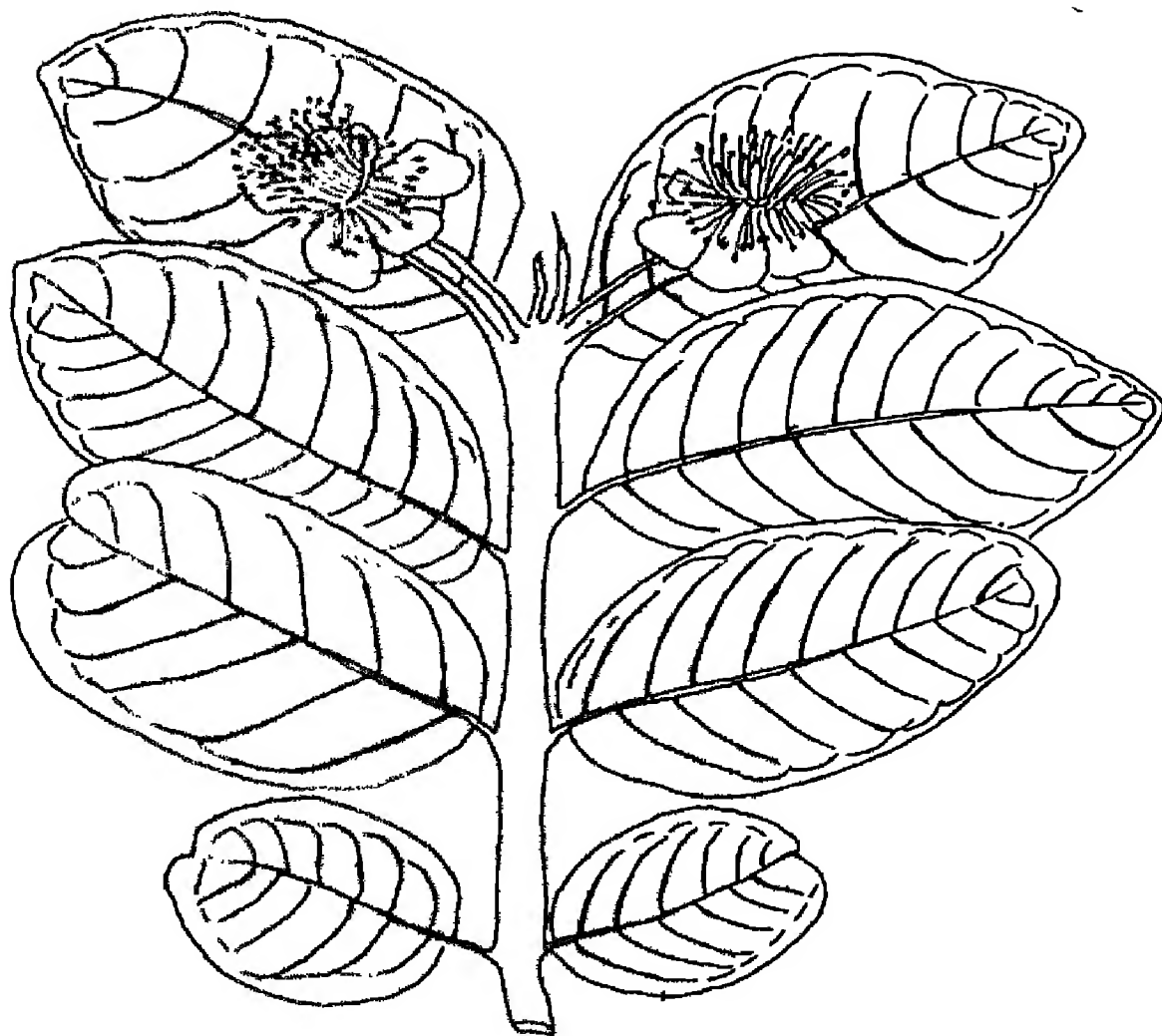


Fig. 45. Psidium quajava L.

MYRTACEAE

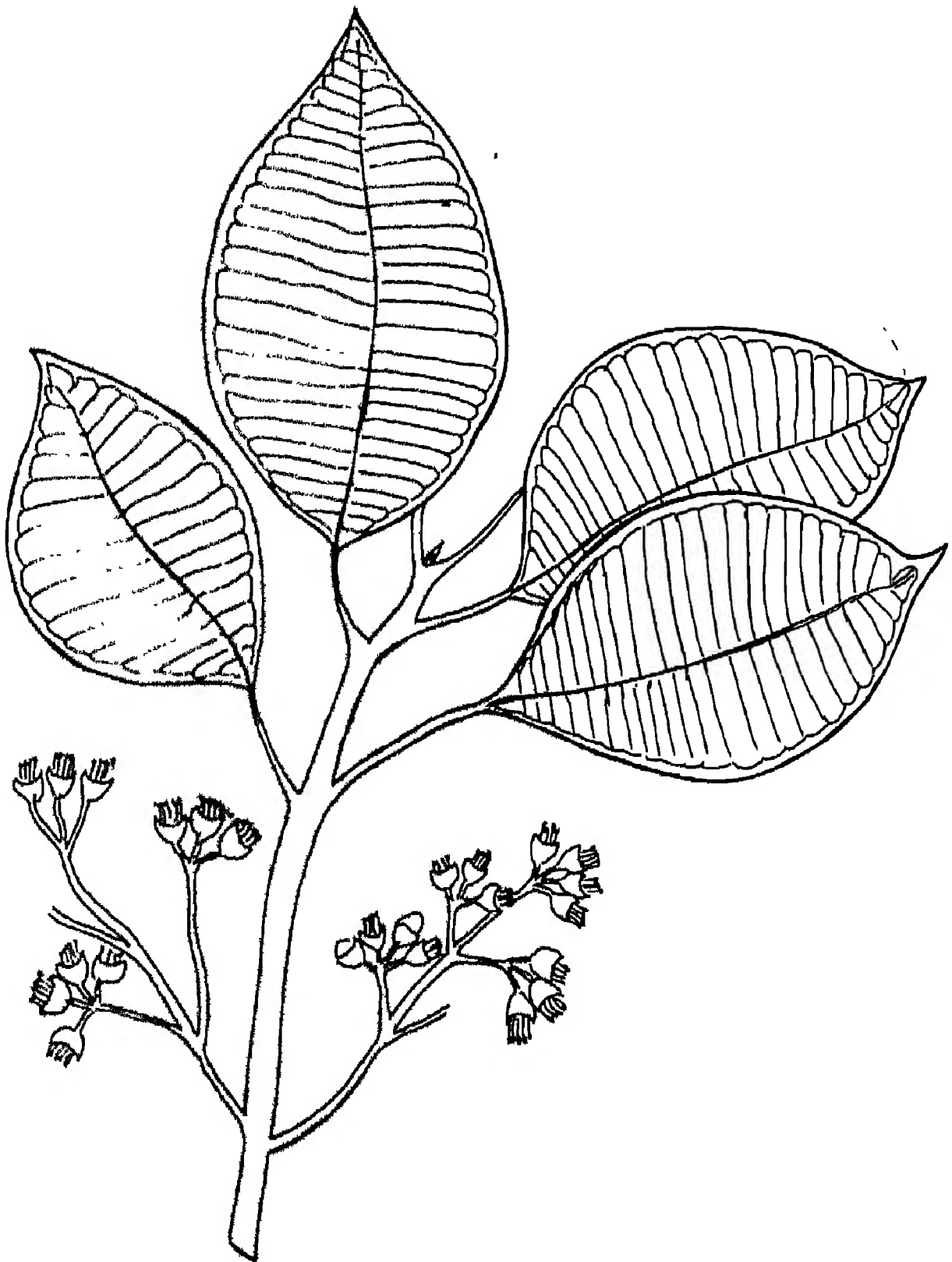


Fig 56 Cyzygium cumuni (L.) Skeels.

LYTHRACEAE



Fig. 47 Lagerstromia indica L.

LYTHRACEAE

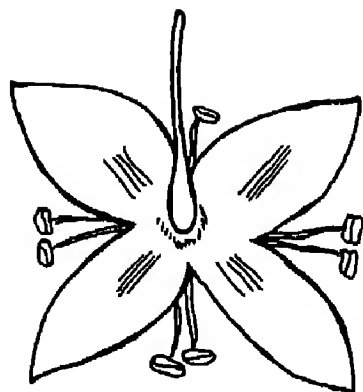
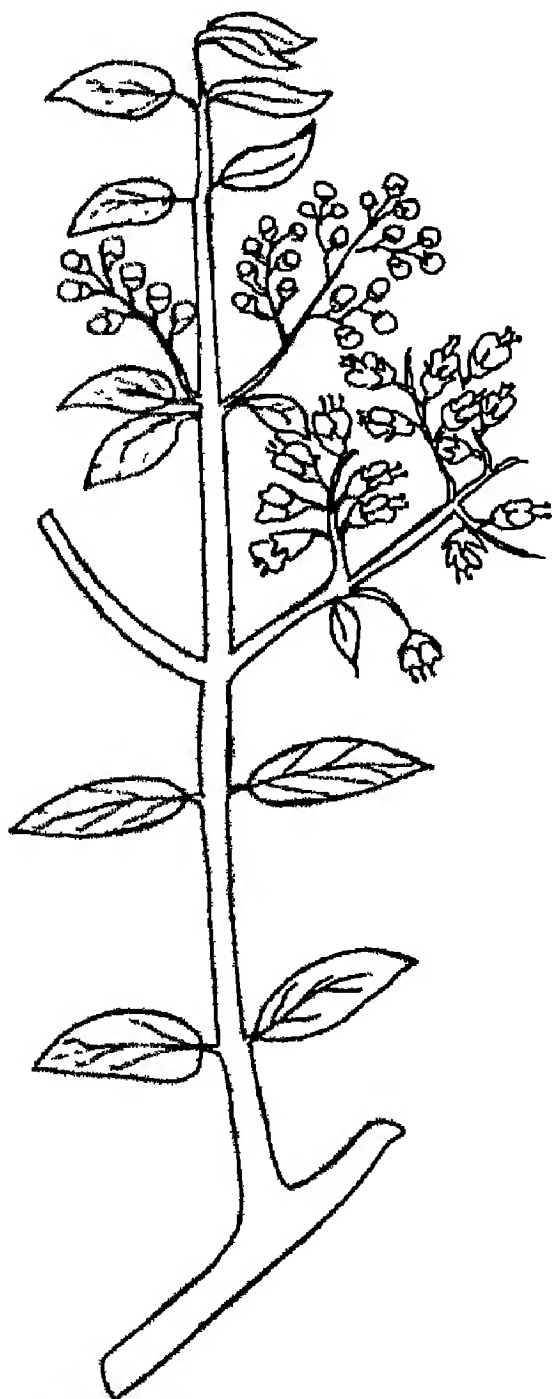


Fig. 48 Lawsonia inermis L.

ONAGRACEAE

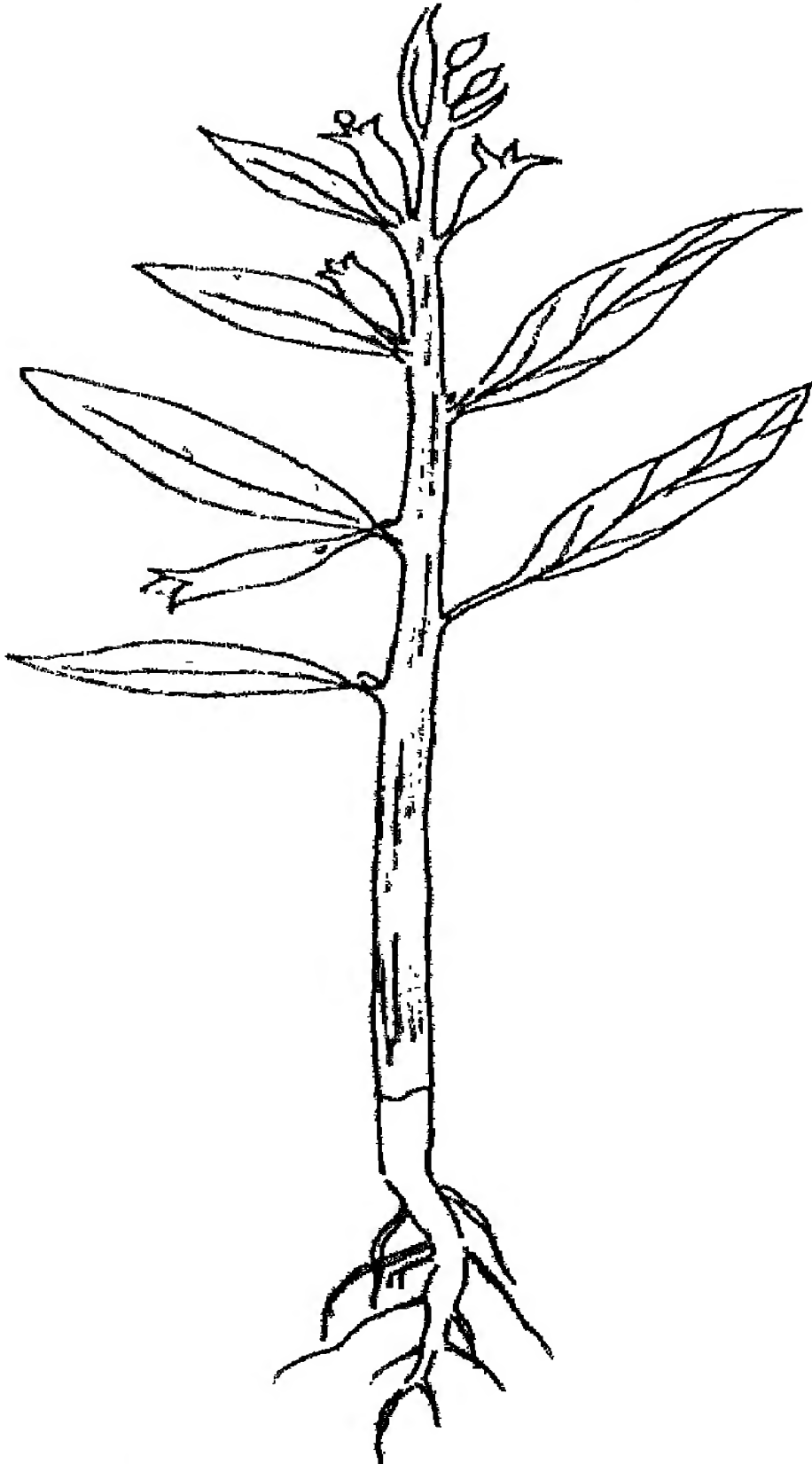


Fig. 49. Ludwigia perennis L.

PASSIFLORACEAE

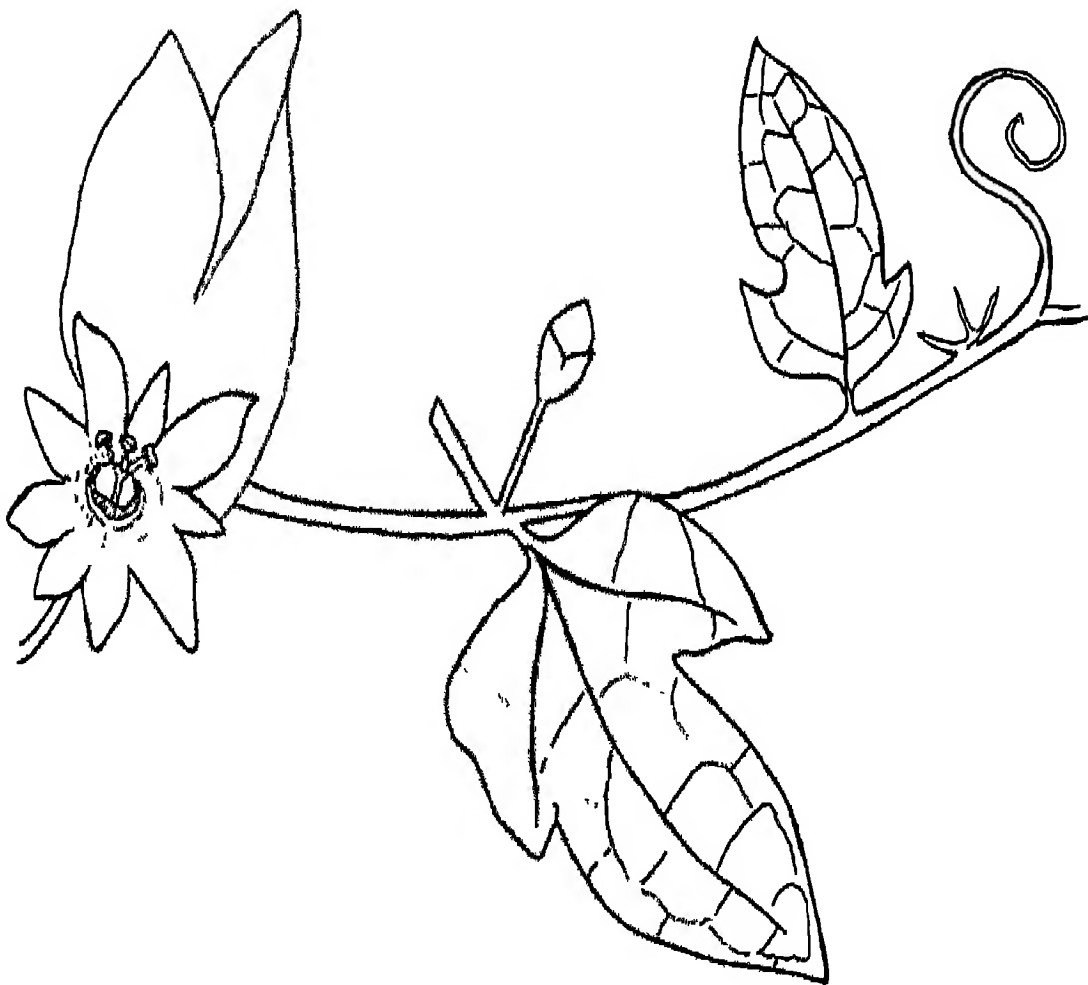
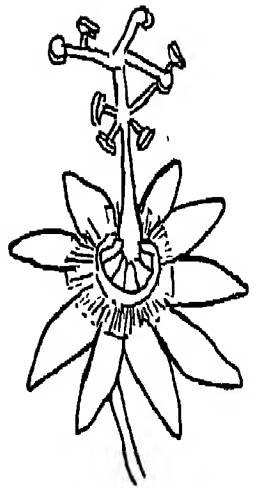


Fig. 50 Passiflora foetida L.

CURCUBITACEAE

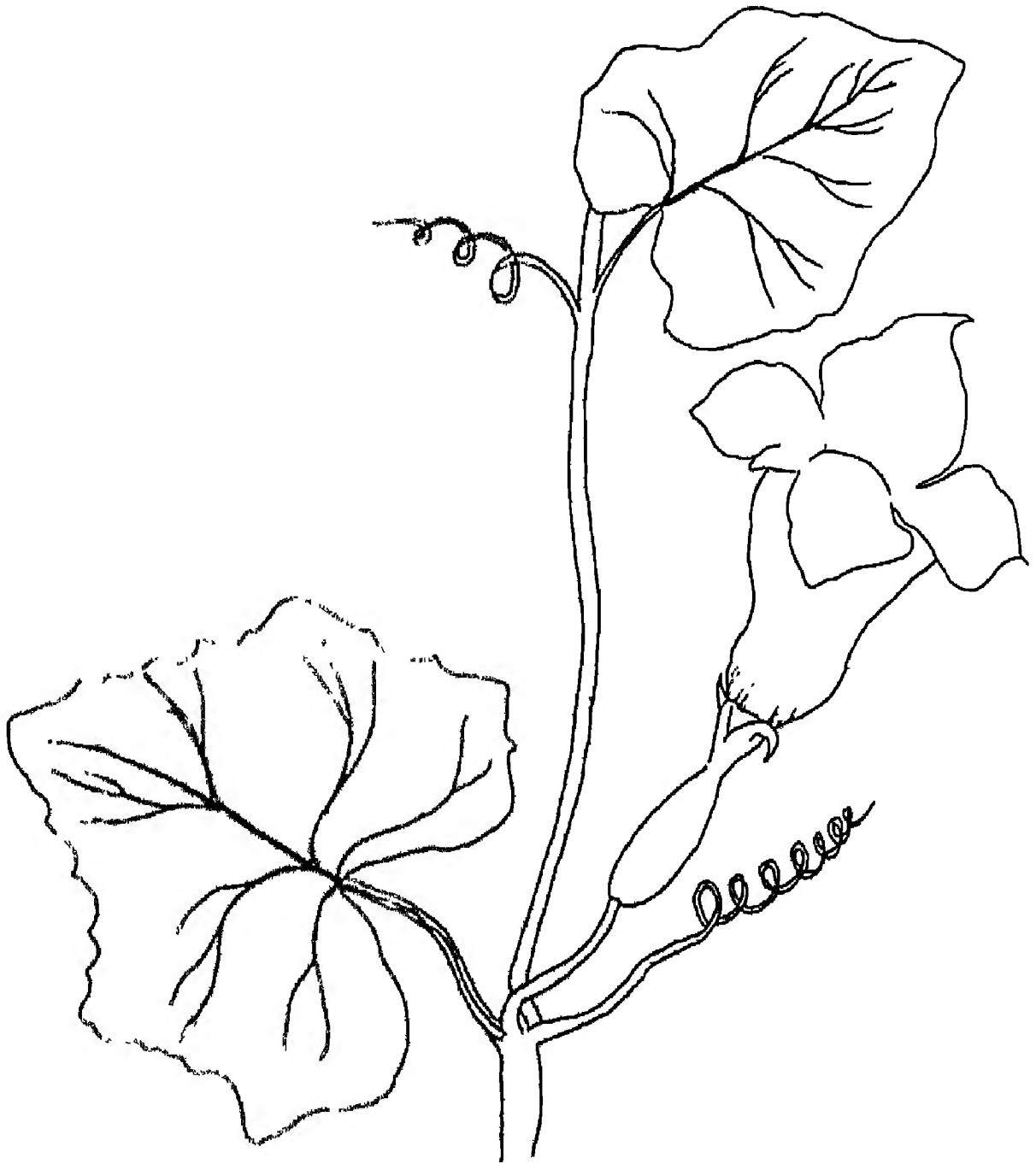


Fig. 51 Luffa cylindrica (L) M. Roem.

CUCURBITACEAE

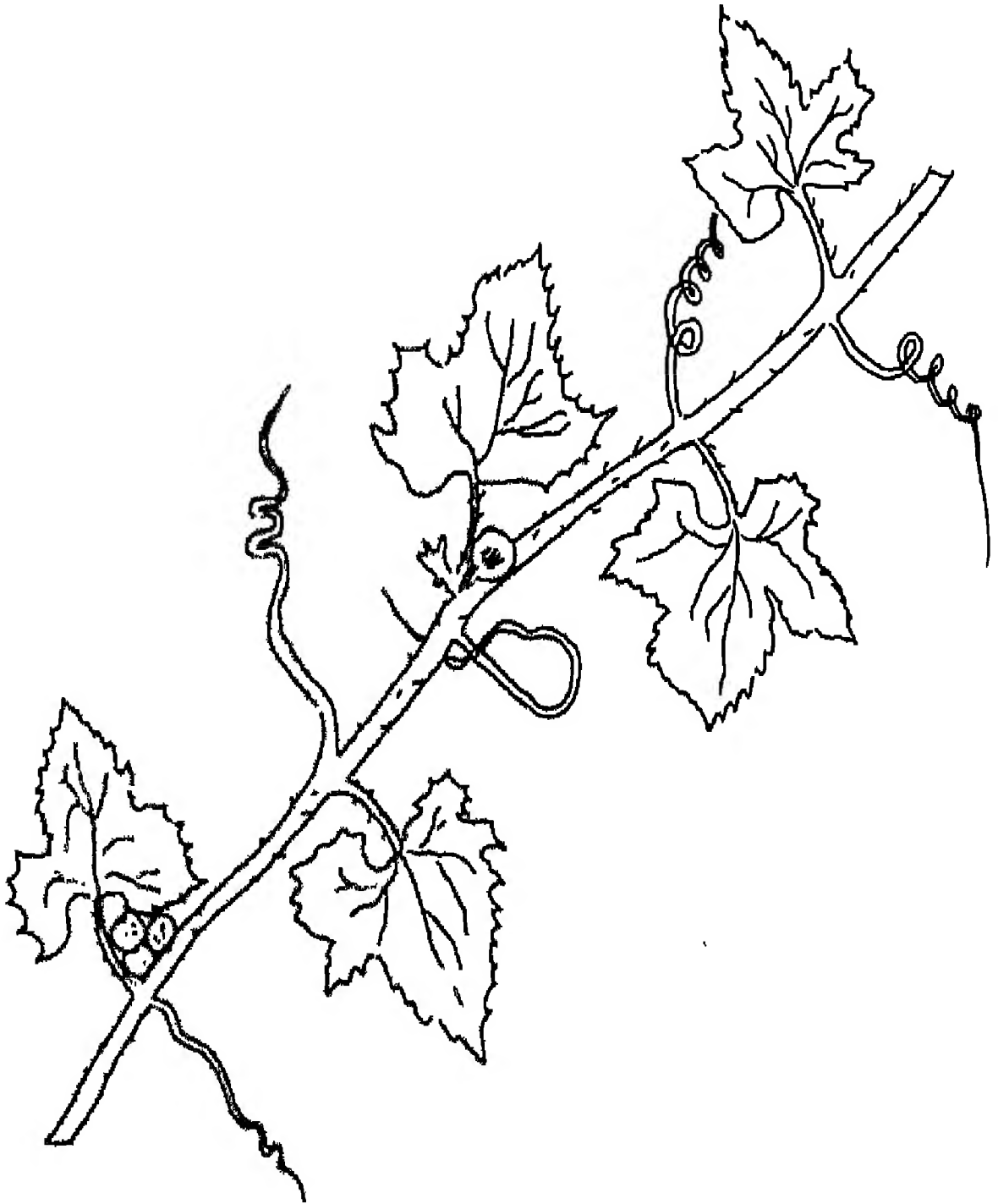


Fig. 52 Melothria maderaspatana (L) Cogn.

MOLLUGINACEAE



Fig. 53 Mollugo pentaphylla L.

APIACEAE

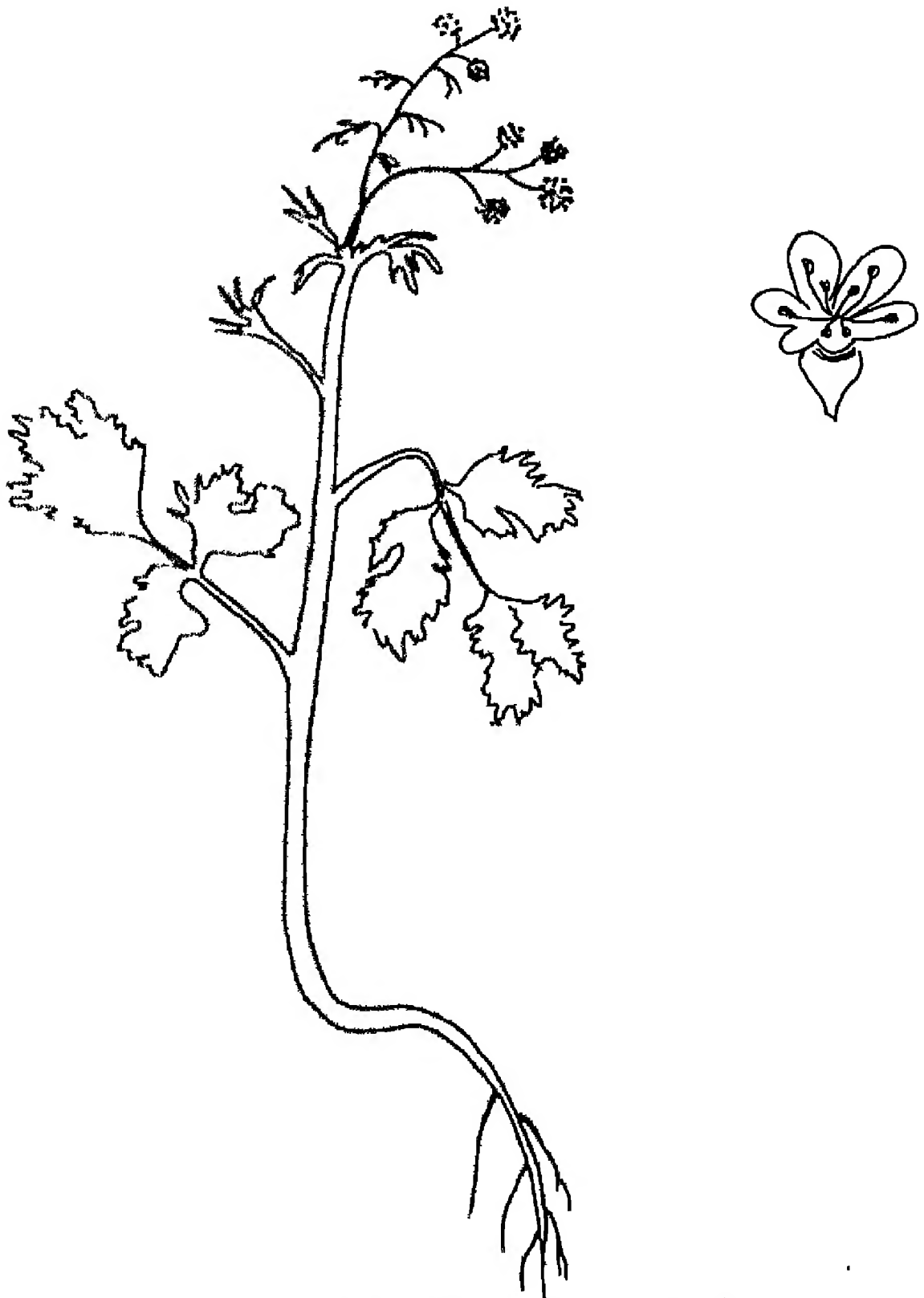


FIG. 54 Coriandrum sativum L.

RUBIACEAE

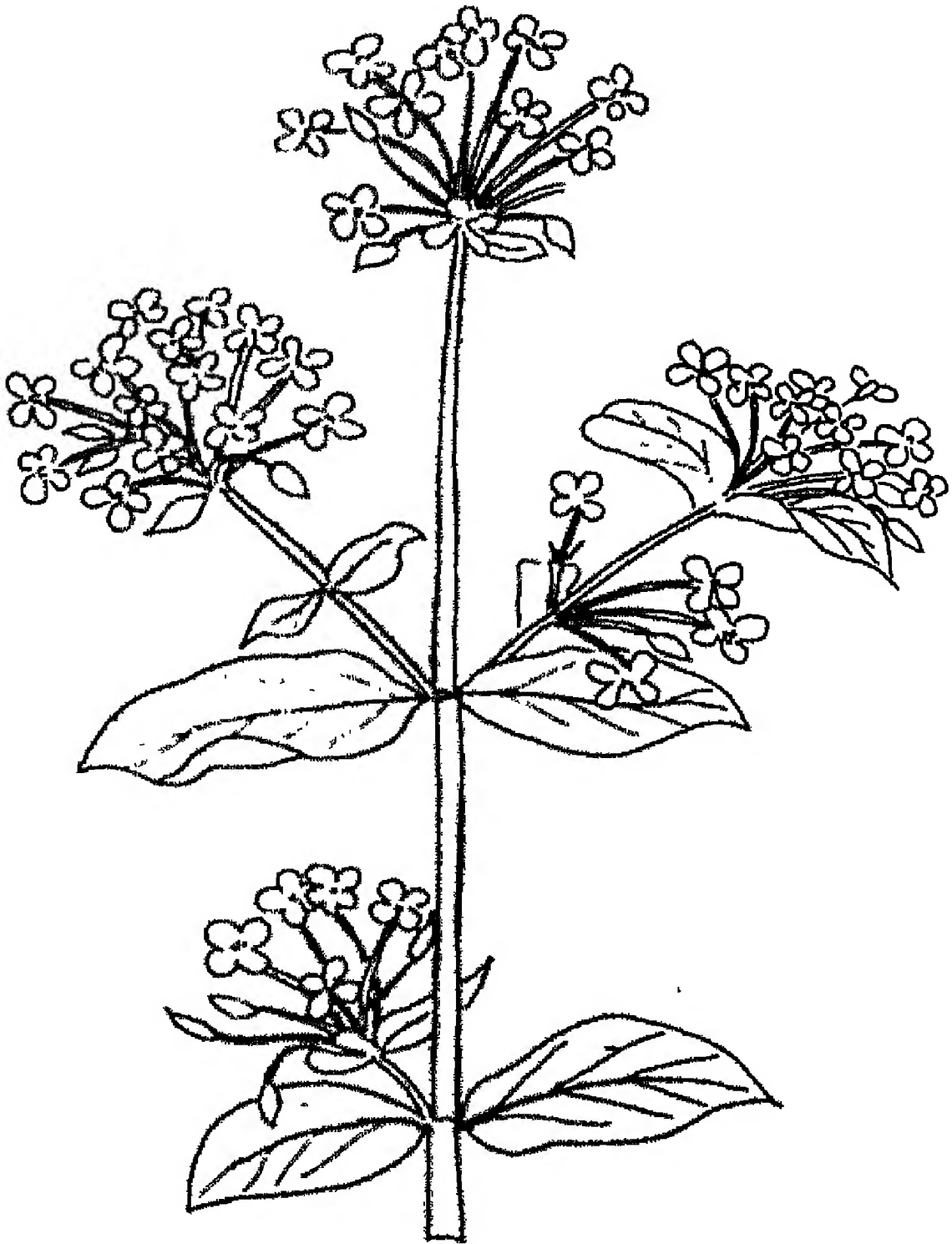


Fig. 5. Ixora arborea Roxb.

RUBIACEAE

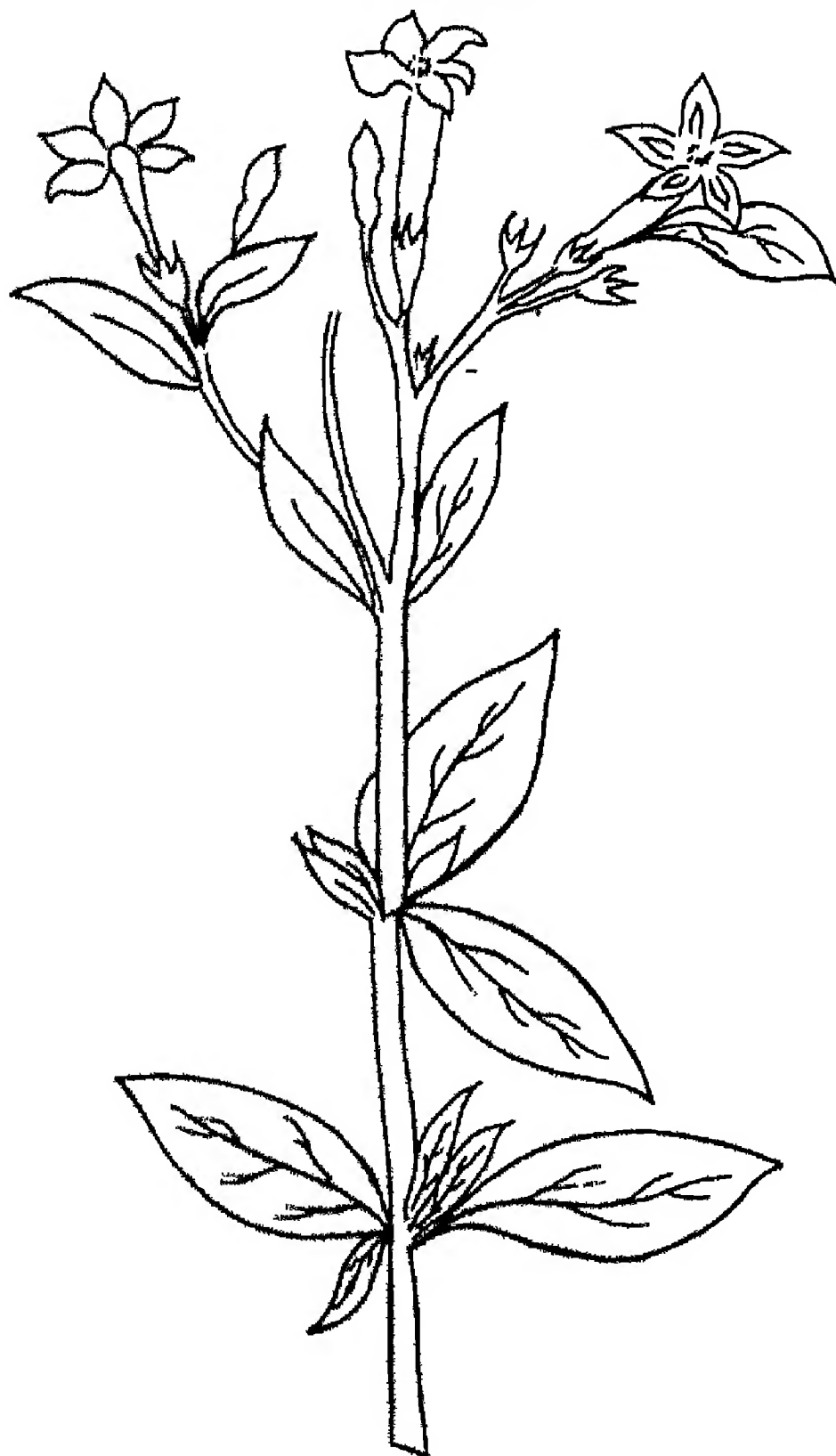


Fig. 56 Mussaenda glabrata (Hook.f.) Hutch.

ASTERACEAE

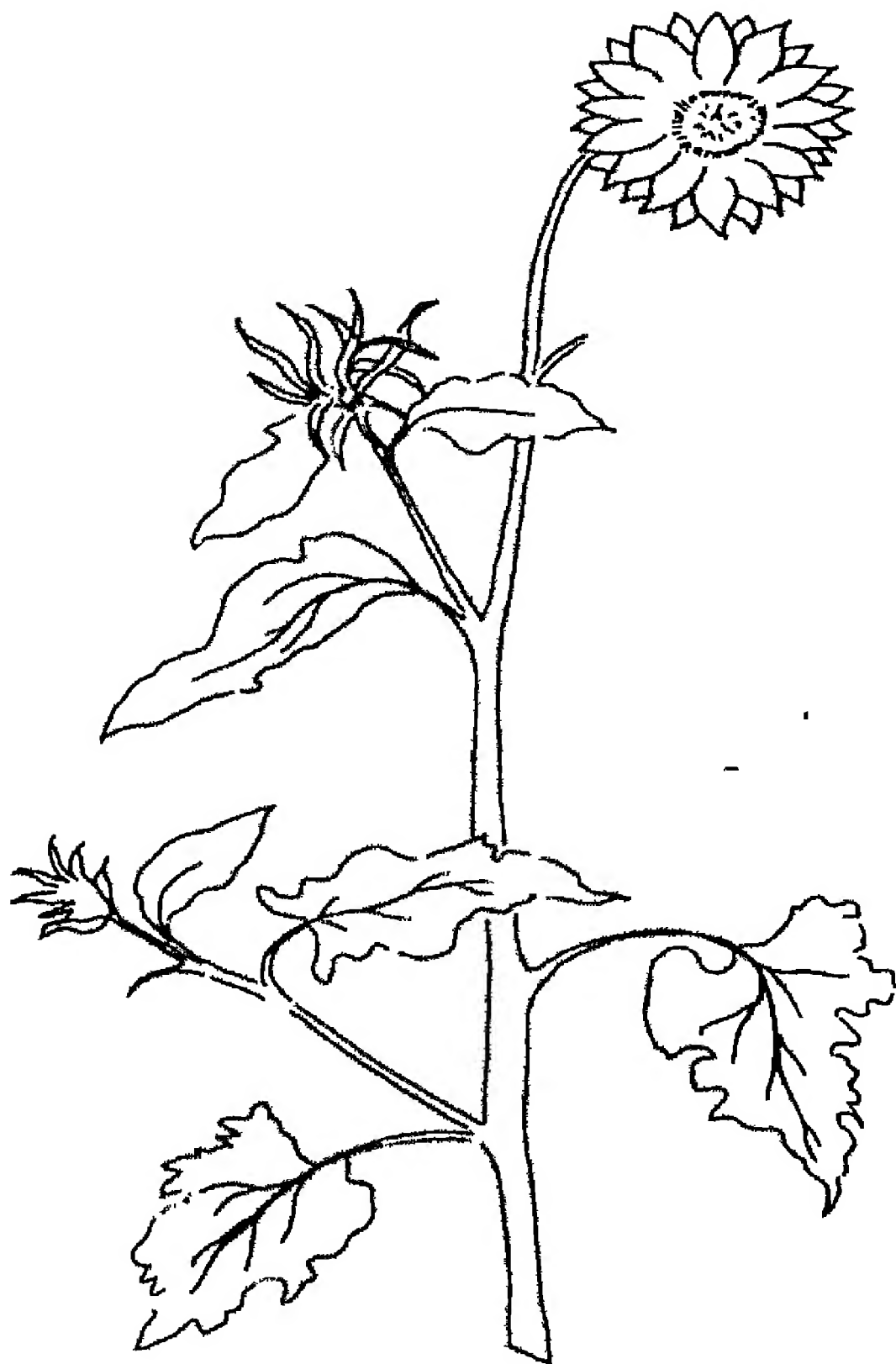


Fig. 57 Helianthus annuus L.

MAPOTACEAE



Fig. 56 Madhuca indica Gmel.

APOCYNACEAE

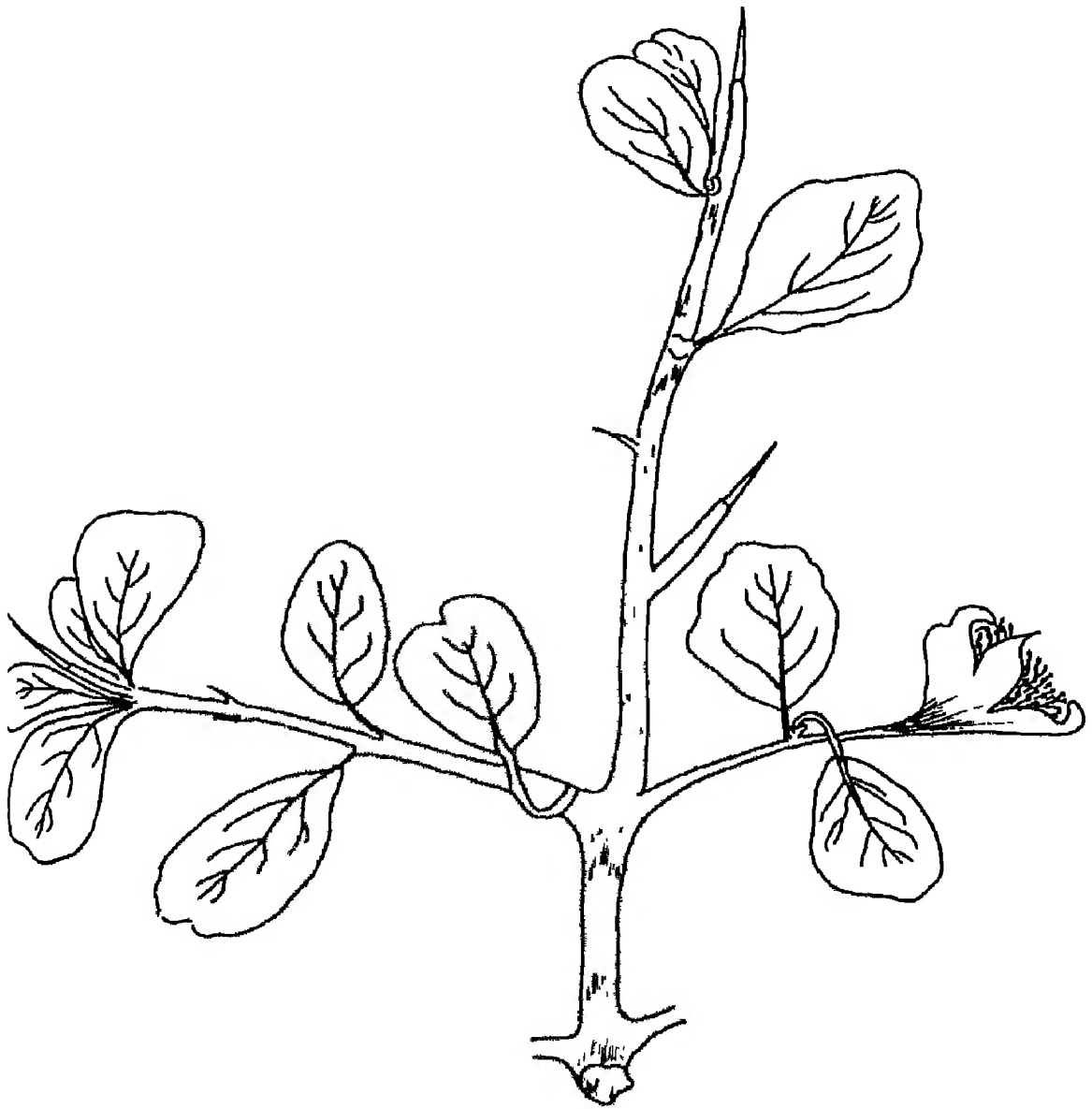


Fig. 59 Carissa carandas L. Hooker.

APOCYNACEAE

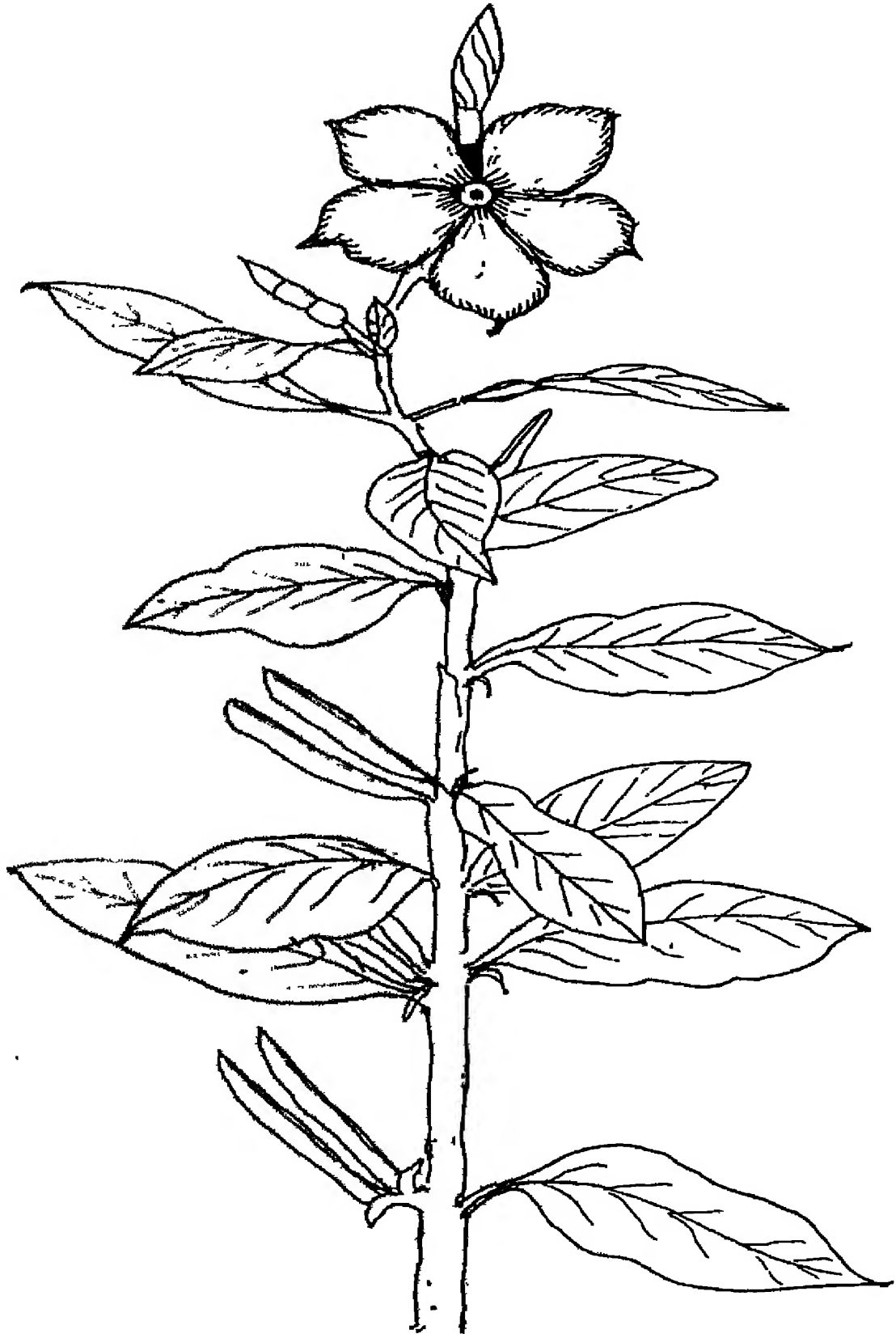


Fig. 60 Catharanthus roseus (L.) G.



APOCYNACEAE

Fig. 61 Nerium indicum Mill.

APOCYNACEAE



Fig. 62 Tabernaemontana divaricata (L.) R.Br.

ASCLEPIADACEAE

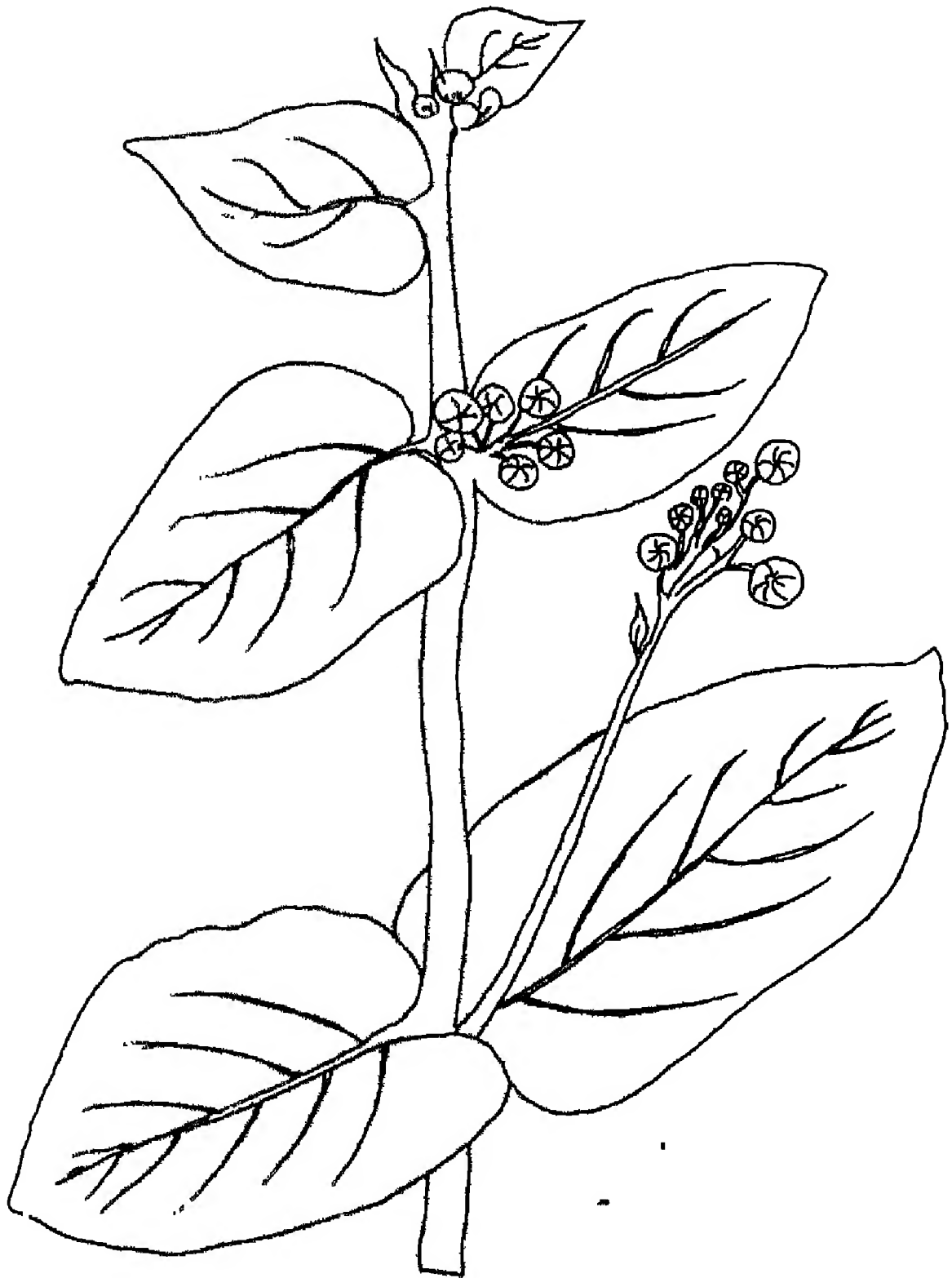


Fig. 63 Caloropsis procera (Ait.) R.

HELIOTROPIACEAE

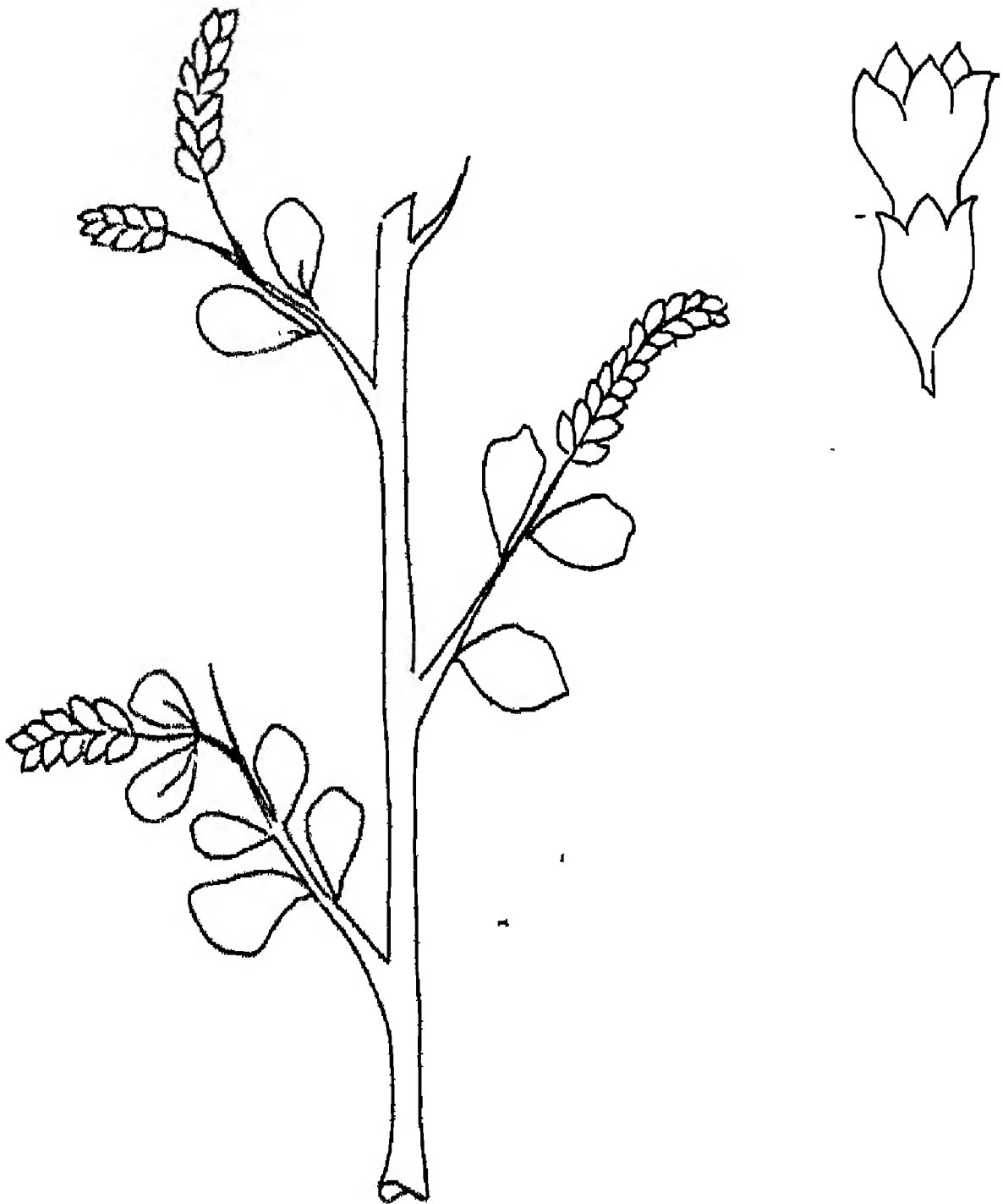


Fig. 64 Melilotropium supinum L.

HELIOTROPIACEAE

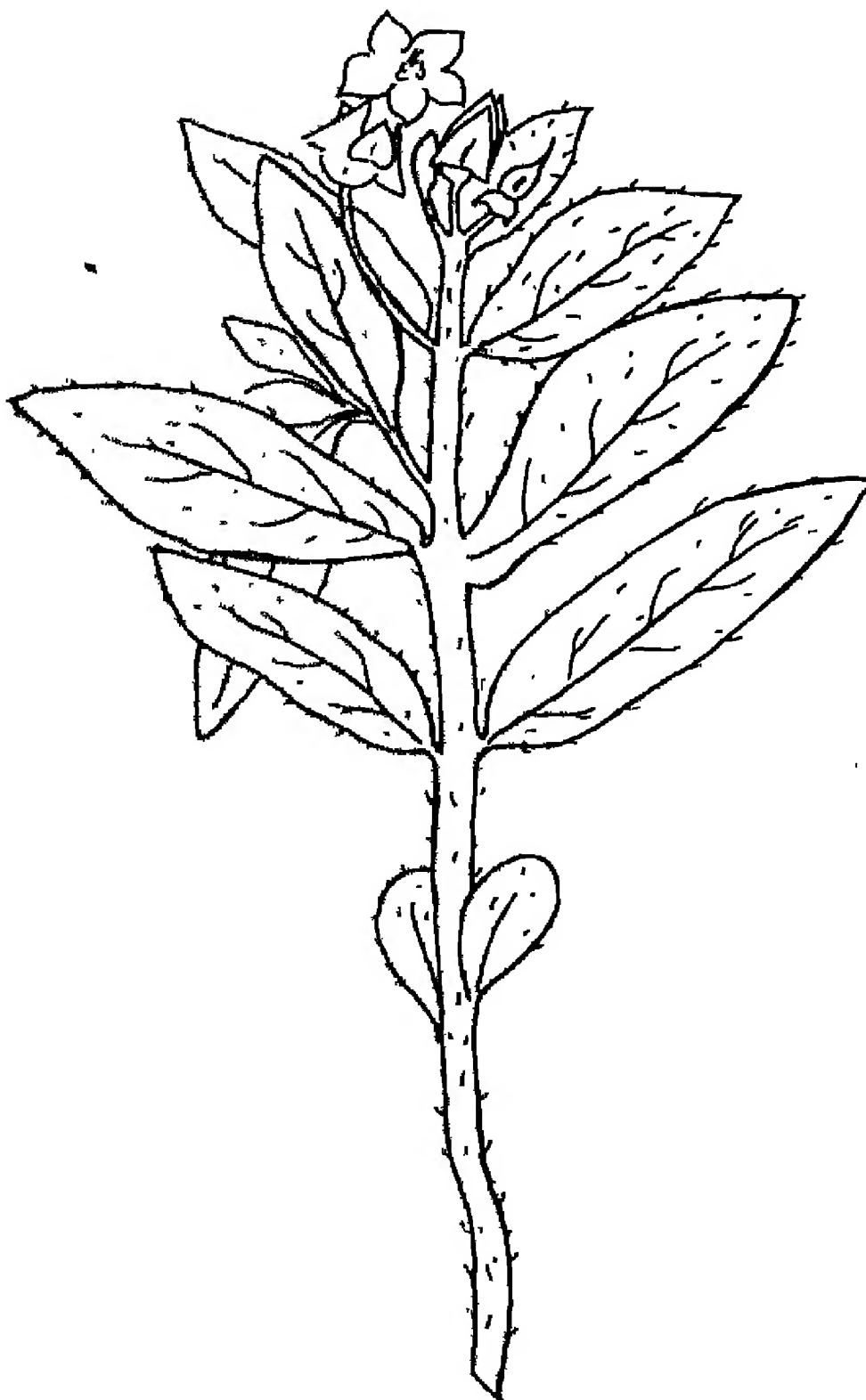


Fig. 65 Trichodesma indicum R.Br.

CONVOLVULACEAE



Fig. 66. Evovulus alsinoides L.

CONVOLVULACEAE



Fig. 67 Ipomoea fistulosa Mart. ex. Choisy.

CONVOLVULACEAE



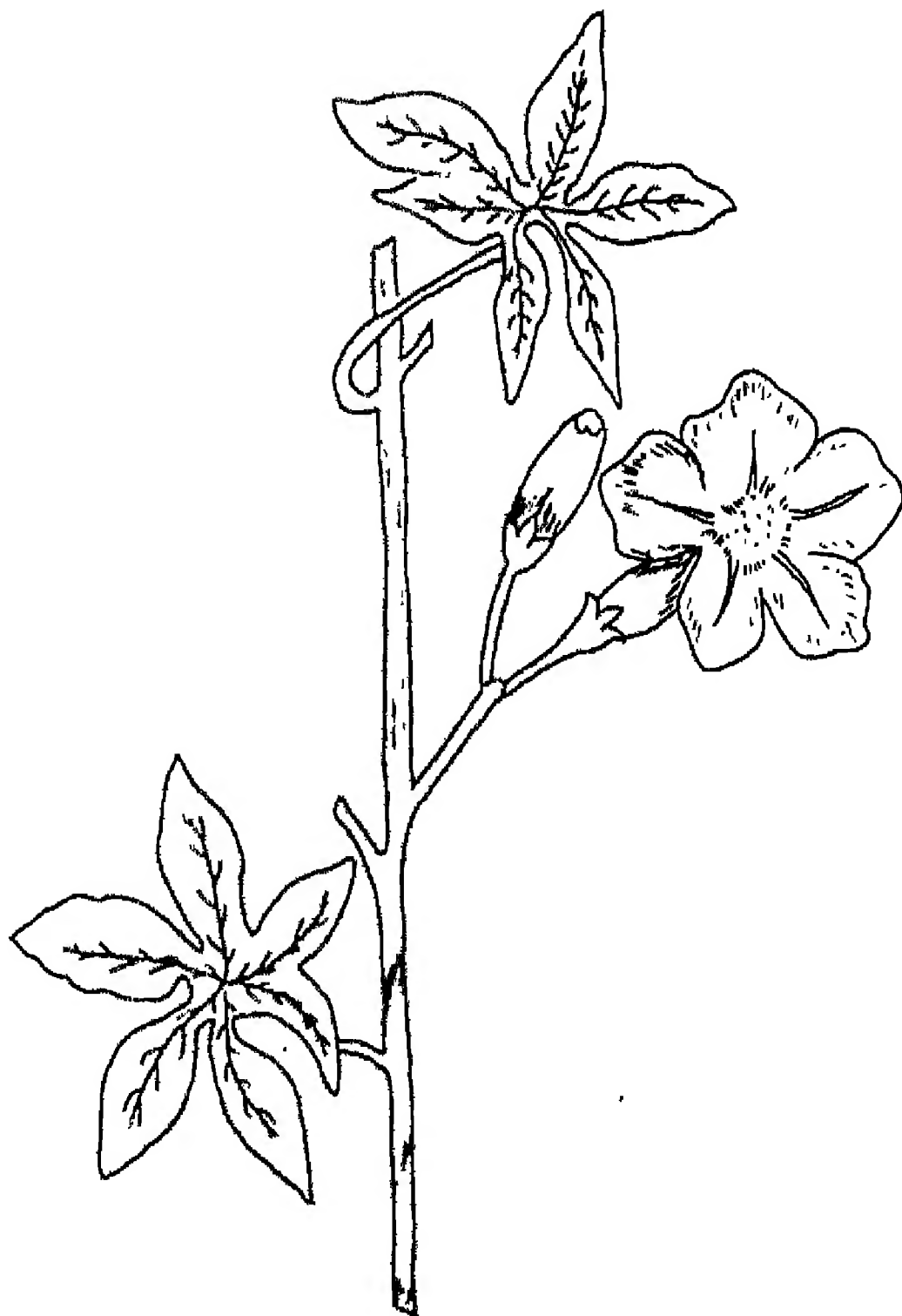
Fig. 68 *Ipomoea nil*(L). Roth.

CONVOLVULACEAE



Fig. 69 Ipomoea aquatica Forsk.

CONVOLVULACEAE



1370 Ipomoea cairica (L) Sweet.

CONVOLVULACEAE

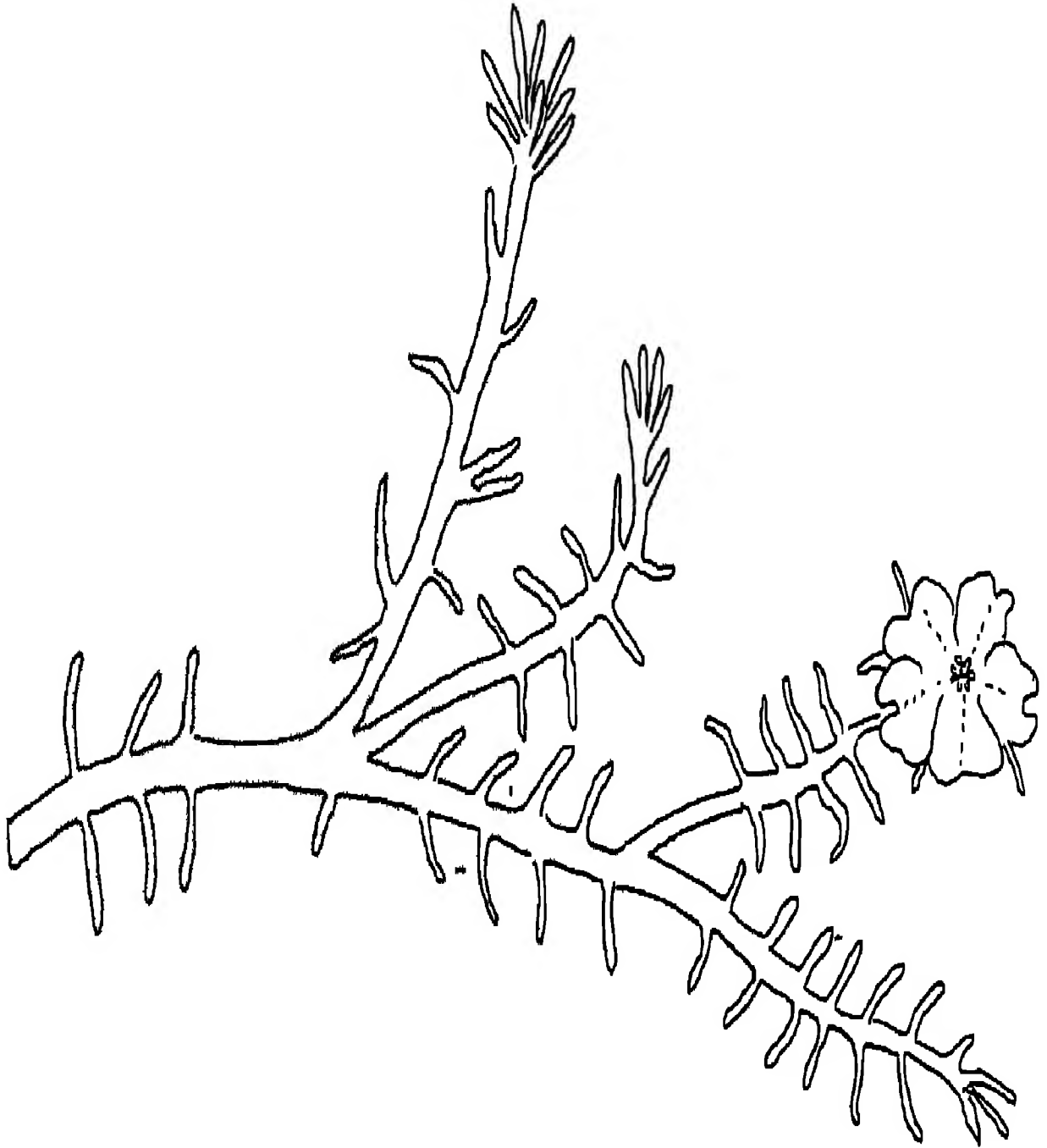
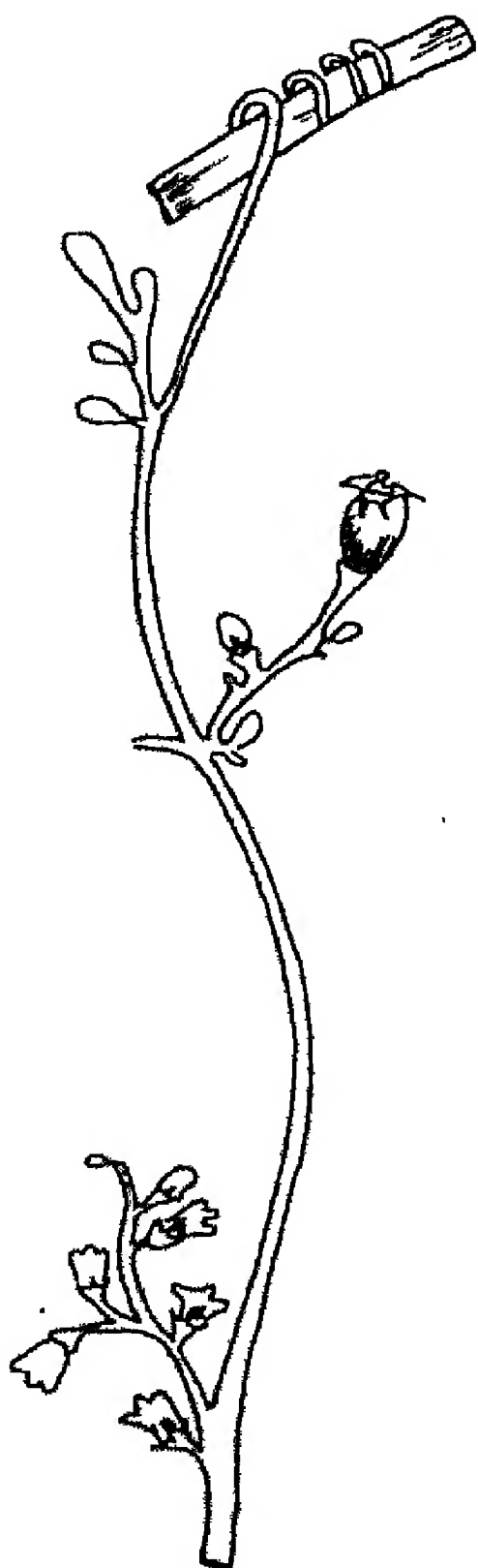


Fig. 71 Ipomoea quamoclit L.



CUSCUTACEAE



Fig. 72 Cuscuta reflexa, Roxb.

SOLANACEAE

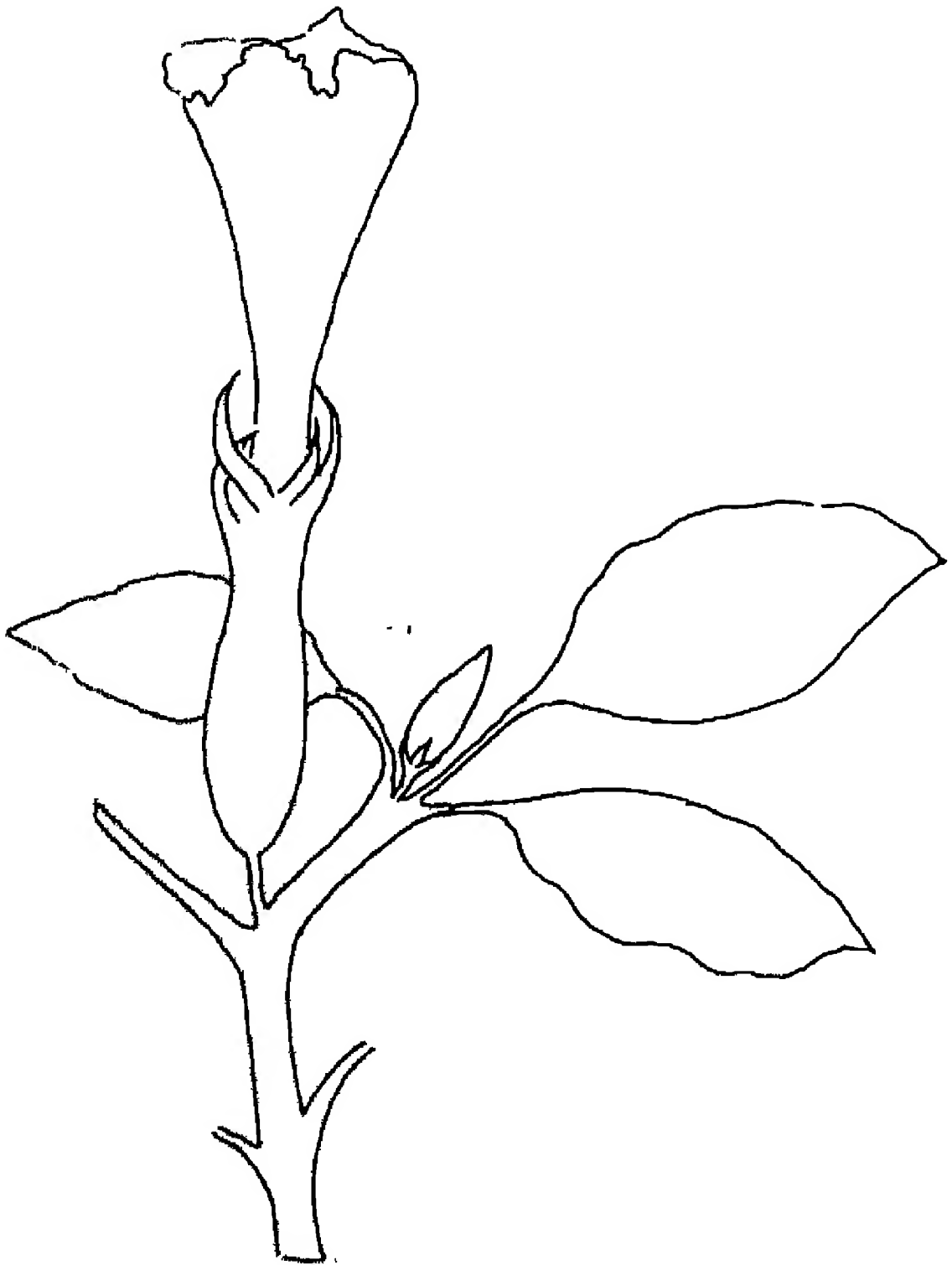


Fig. 13 Datura metel L.

SOLANCEAE

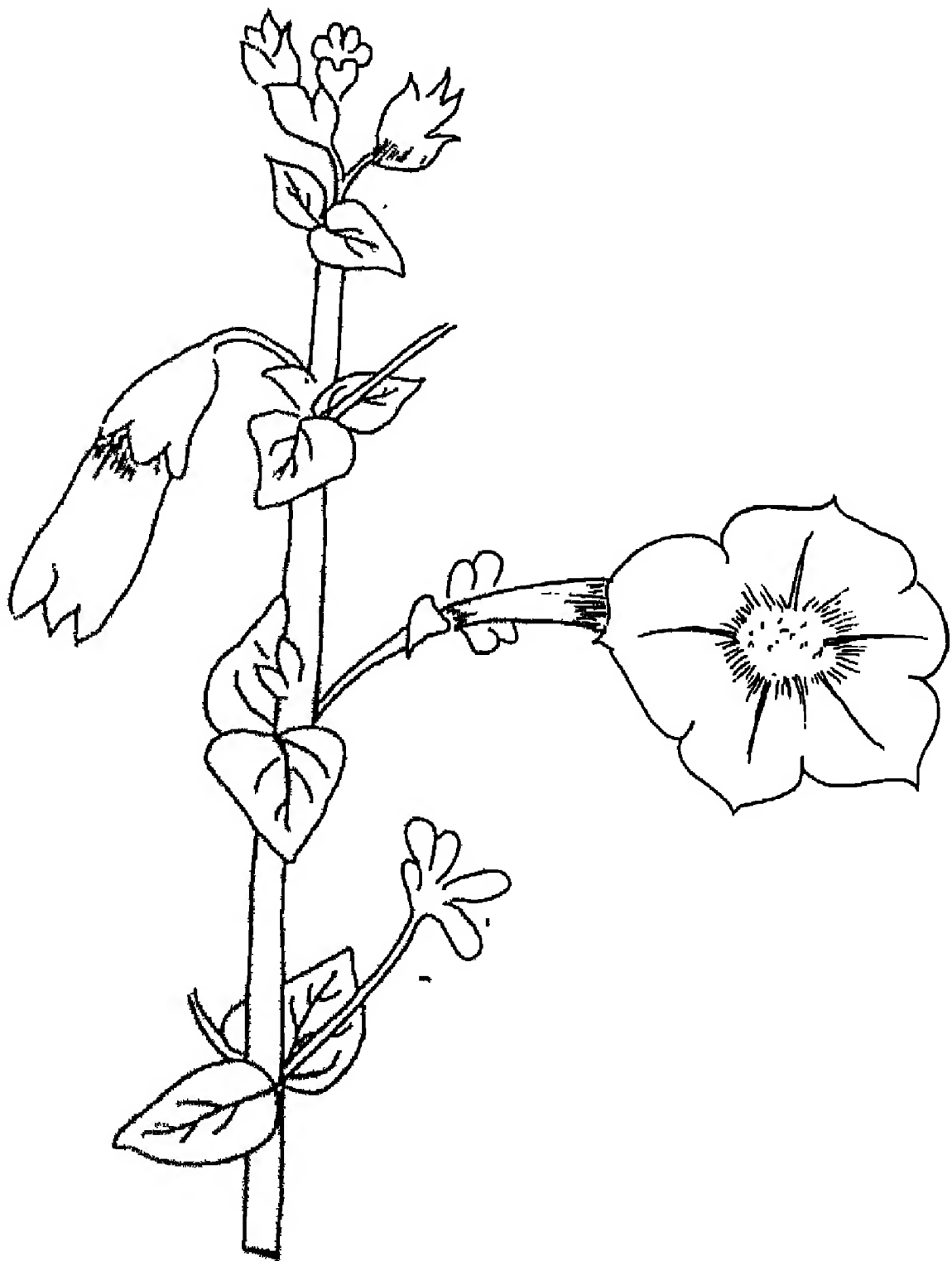


Fig 74 Potunia nyctaginiflora Juss.

SOLANACEAE

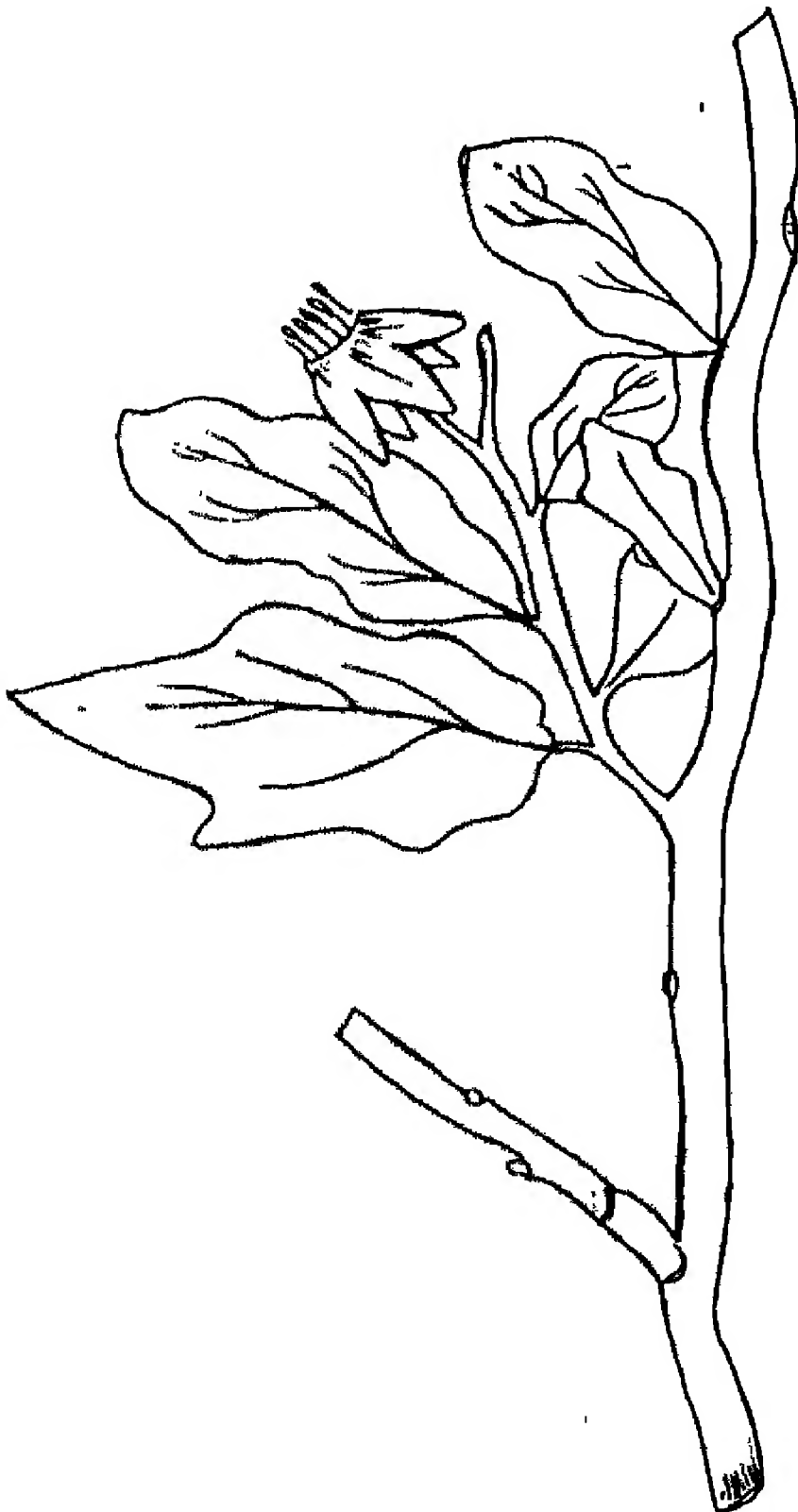


Fig. 75. Solanum melongena L.

SOLANACEAE



Fig. 76 Solanum nigrum L.

SOLANACEAE

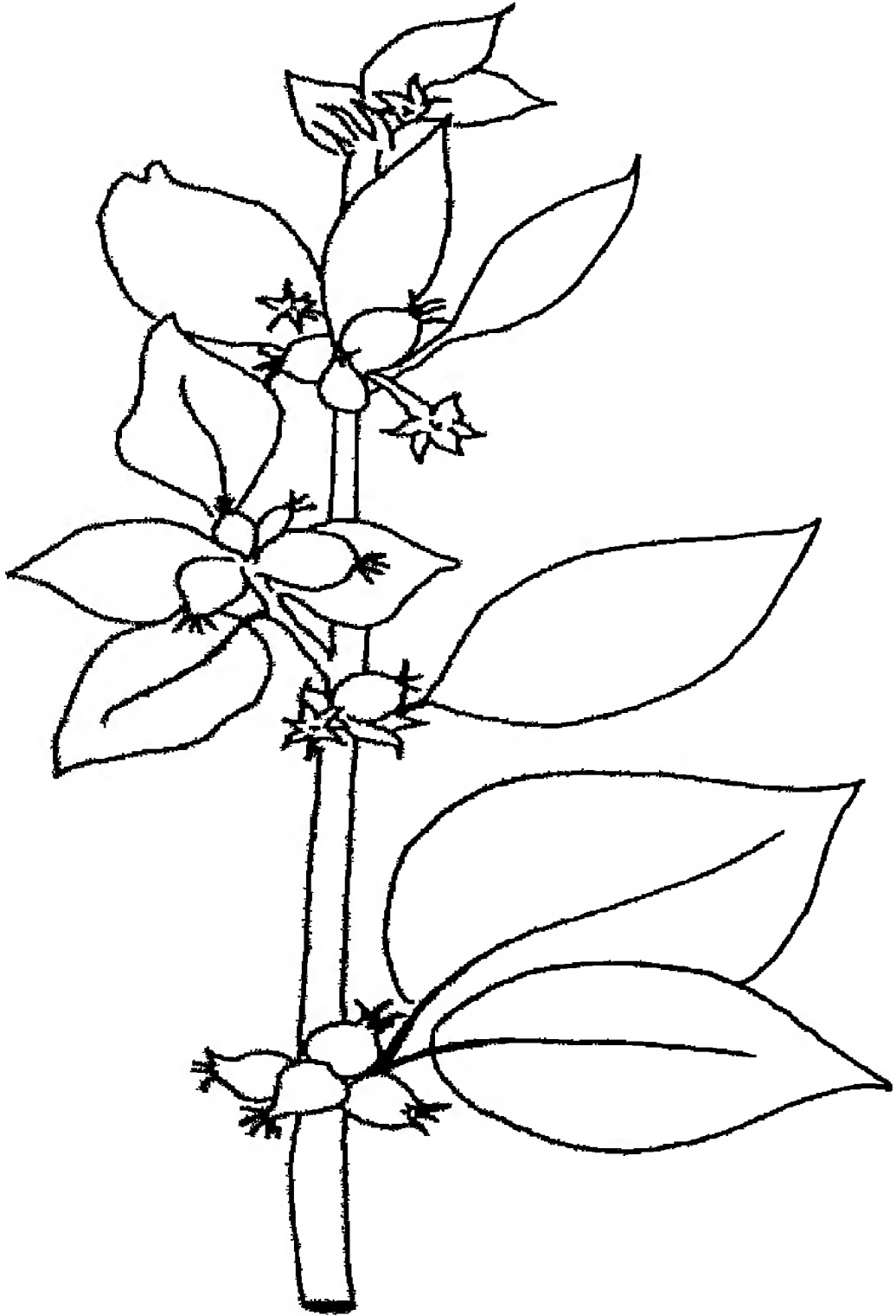


Fig. 77 Withania somnifera.

SCROPHULARIACEAE

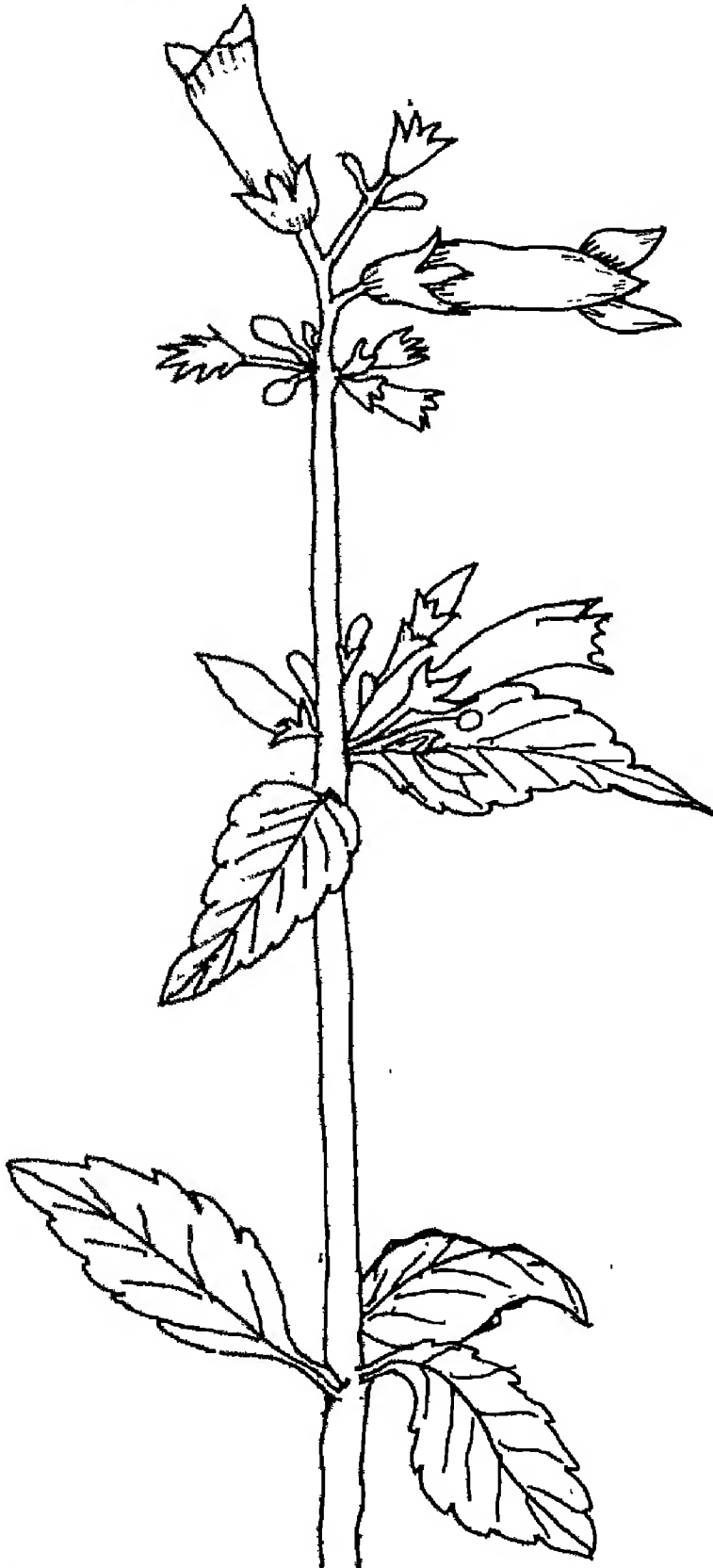


Fig. 78 Russelia equisetiformis Schlecht. and Cham.

SCROPHULARIACEAE

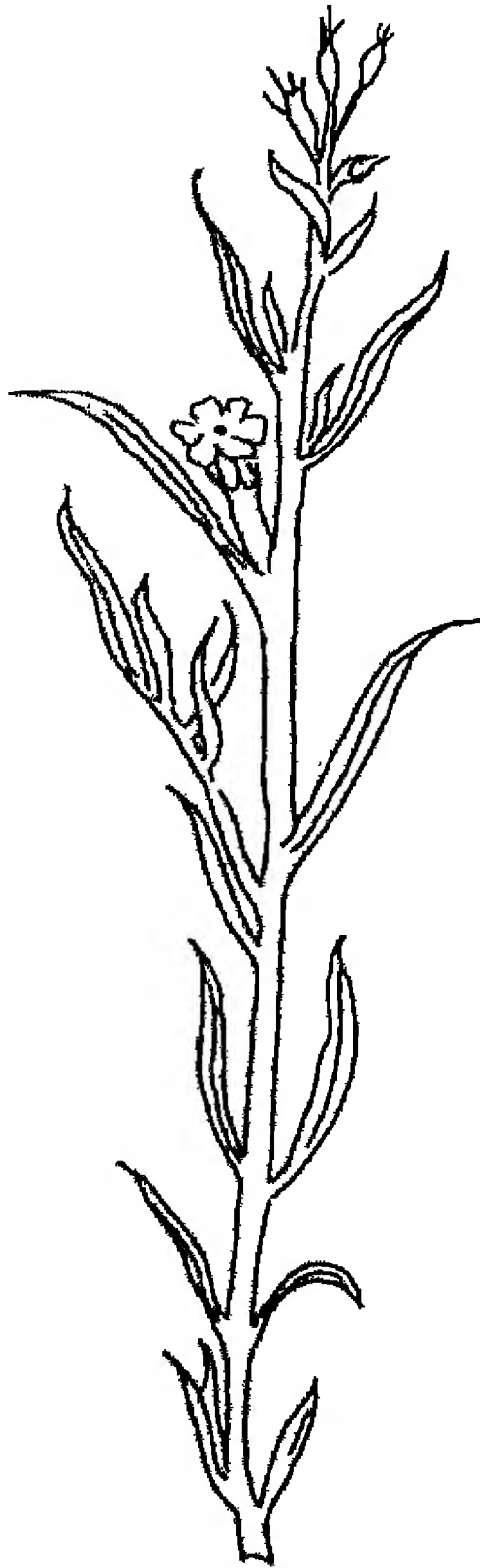


Fig. 79 Striga angustifolia (Don.) Sald.

MARTYNIACEAE

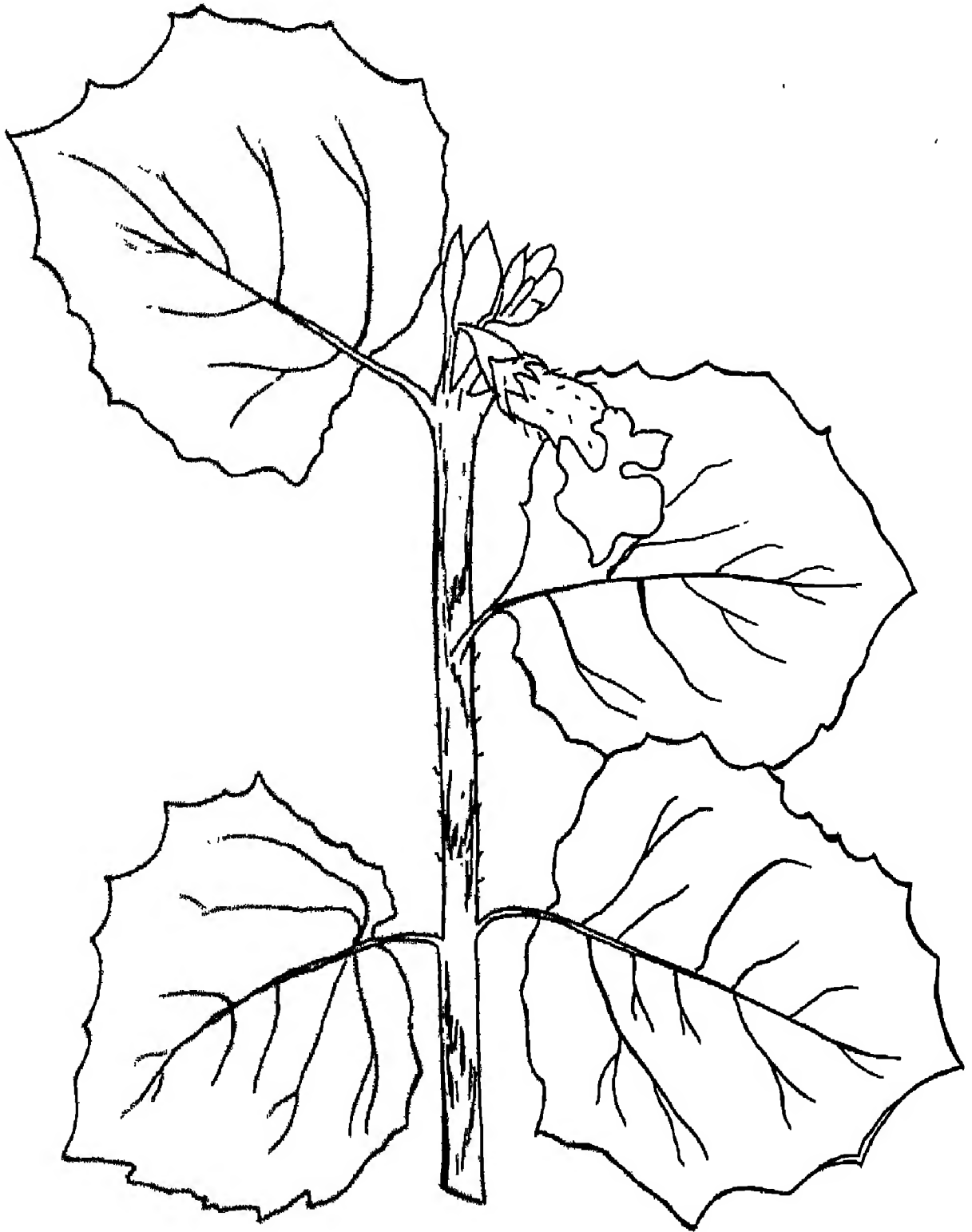


Fig 80 Martynia annua L.

ACANTHACEAE



Fig.81 Rungia repens (L). Nees.

ACANTHACEAE



Fig. 82 Adhatoda vasica Nees.

ACANTHACEAE



Fig. 83 Barleria prionitis L.

ACANTHACEAE

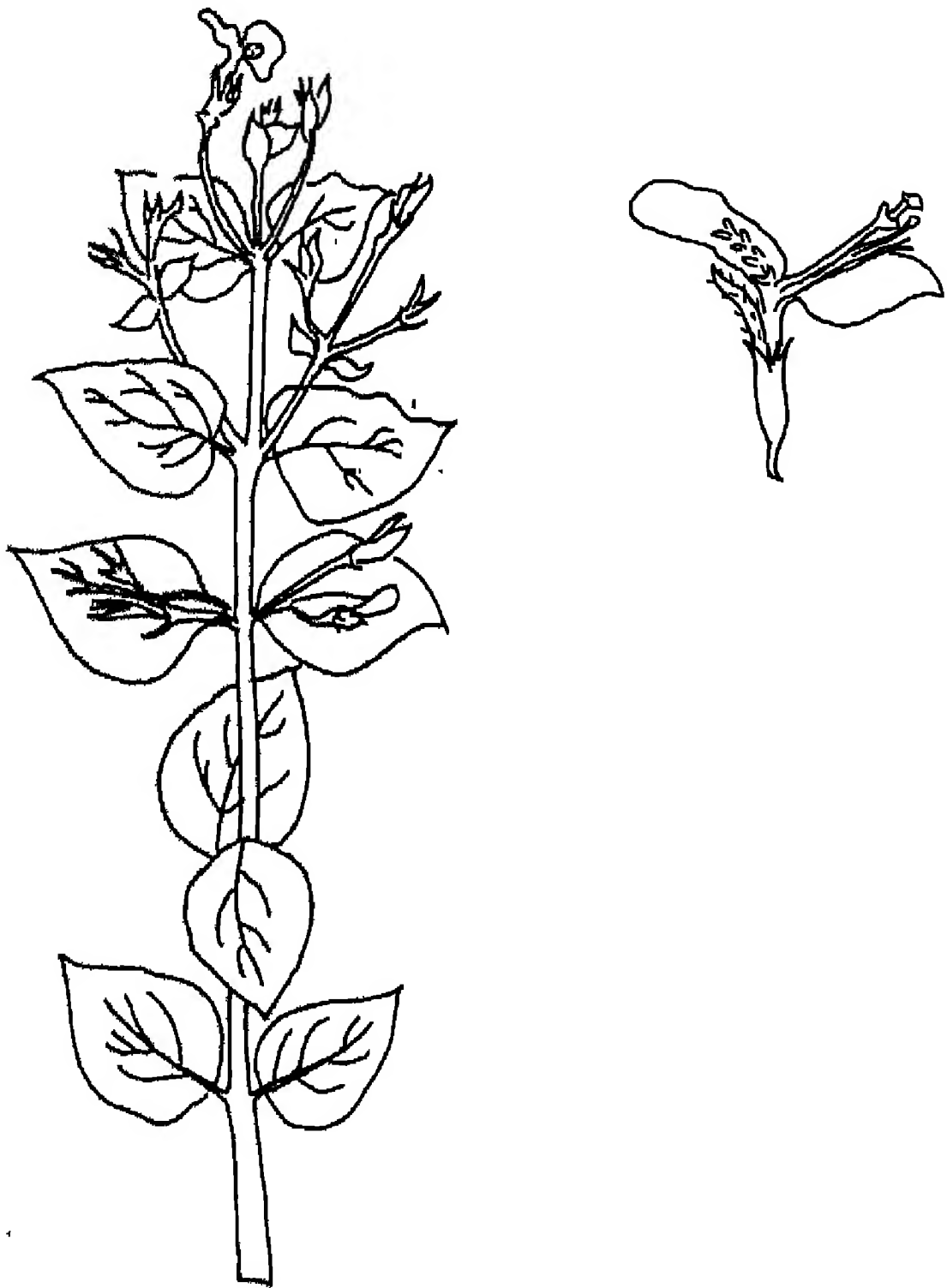


Fig-64 Peristrophe bicalyculata (Retz.) Nees.

VERBENACEAE

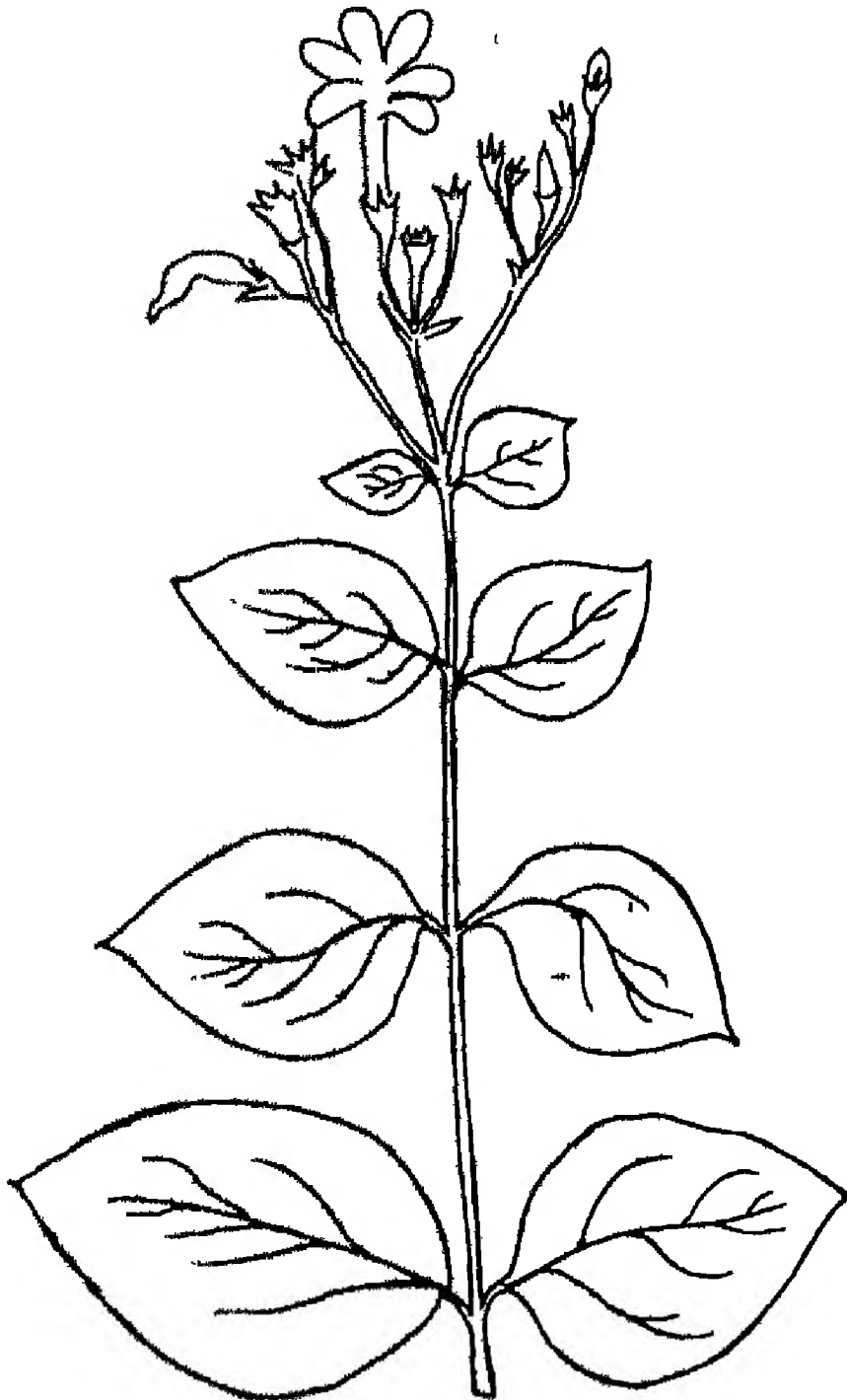


Fig 86 Clerodendrum interme (L) Gaertn.

VERBENACEAE

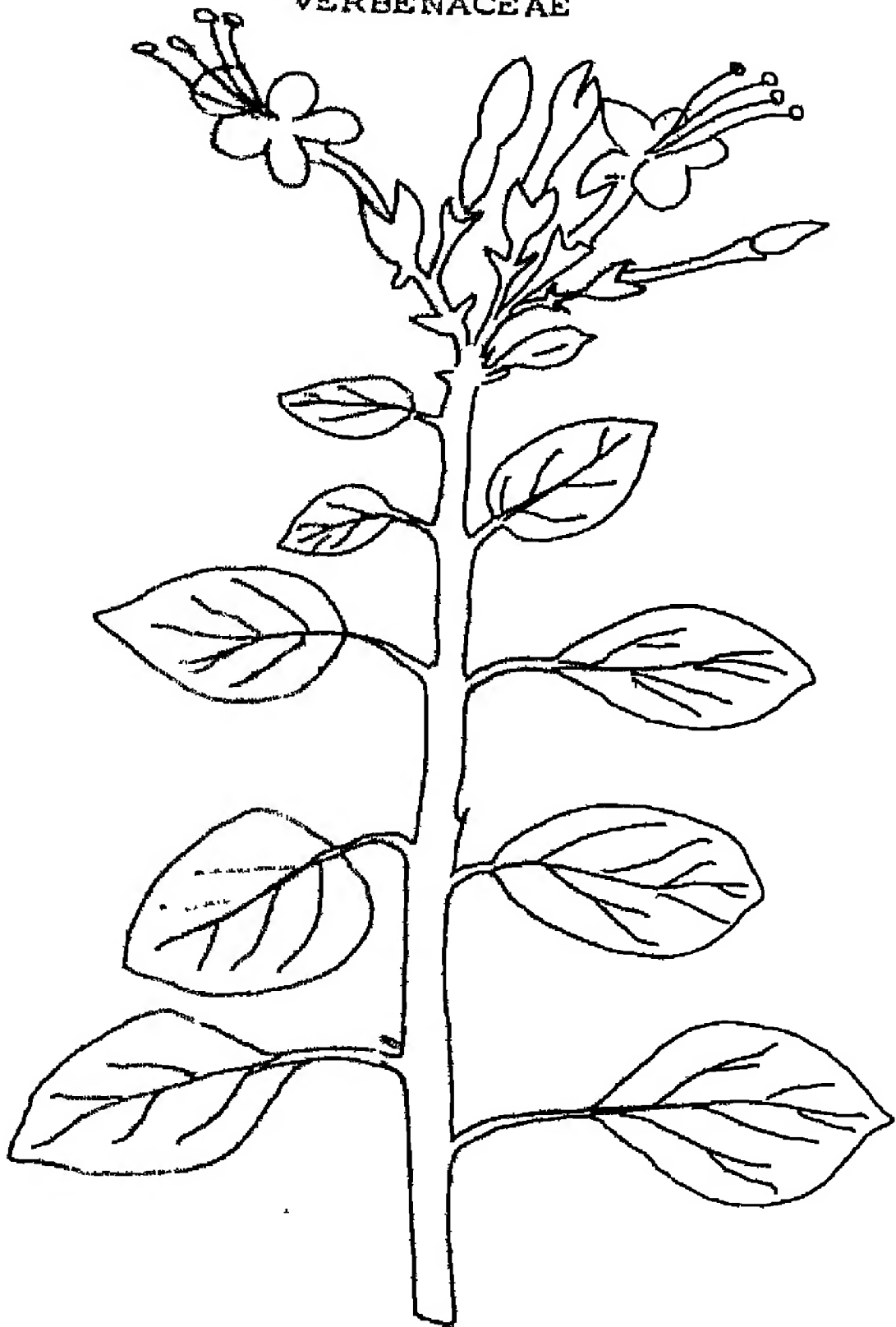


Fig. 85 Clerodendrum phlomidis L.

VERBENACEAE

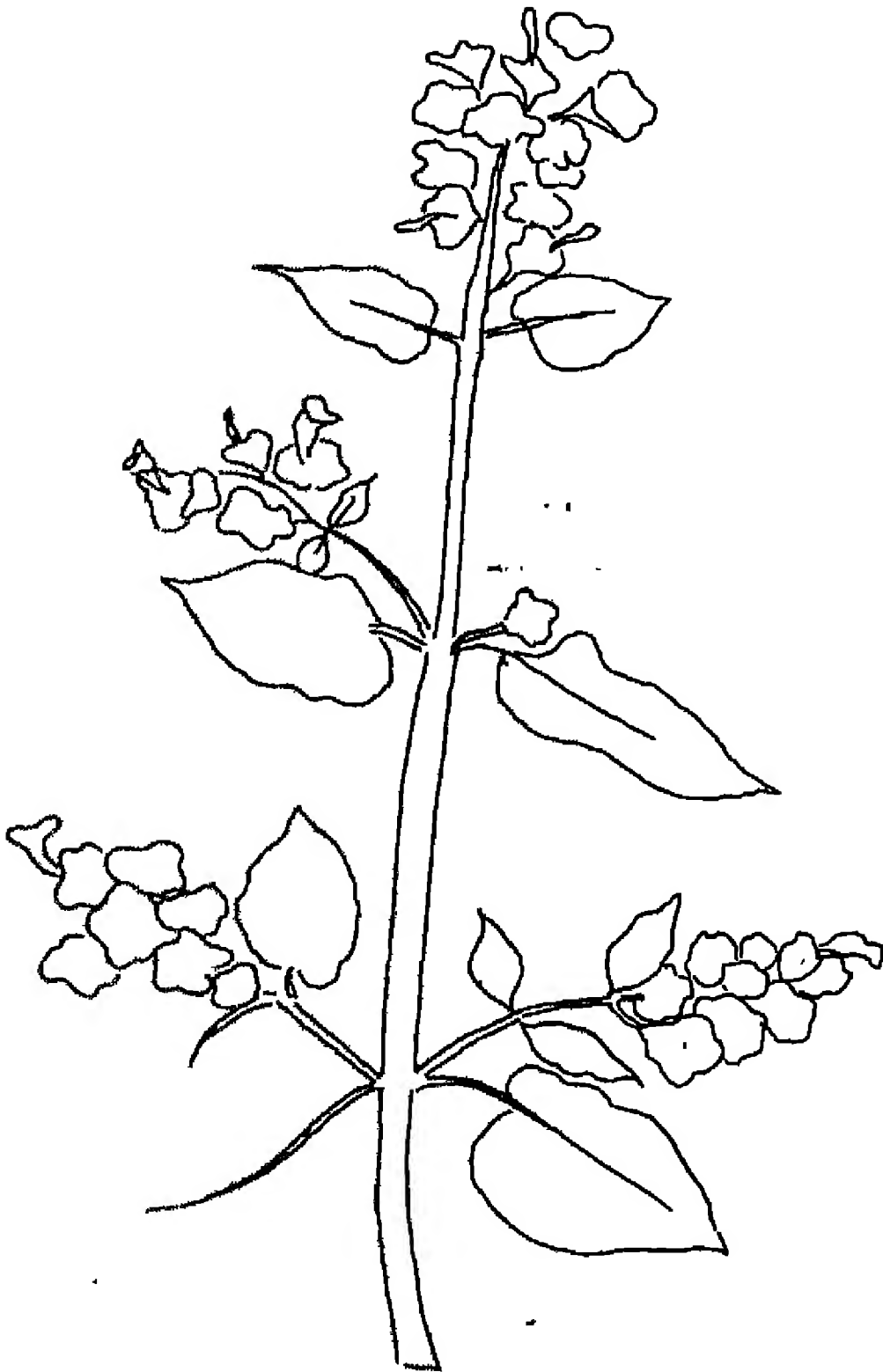


Fig. 87 Holmskioldia sanguinea Retz.

VERBENACEAE

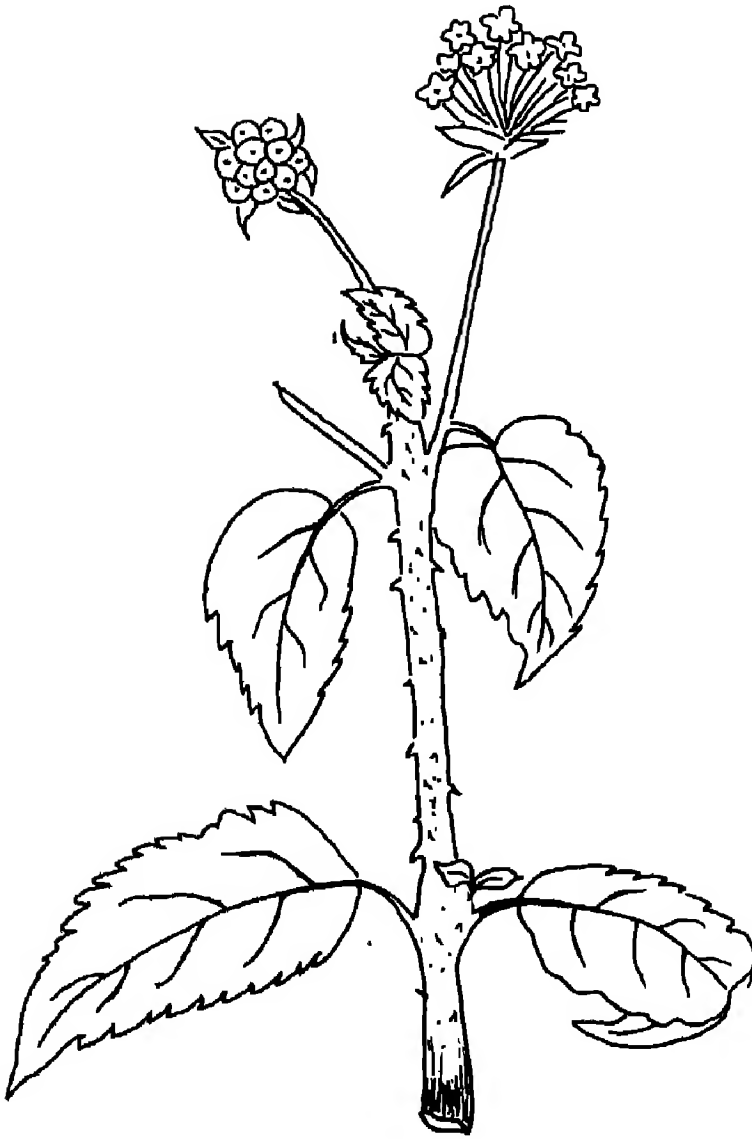
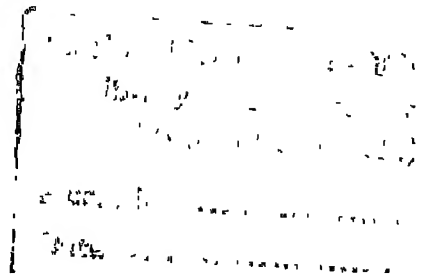


Fig.88 Lantana camara. L. var. aculeata (L) Moldenke.



VERBENACEAE

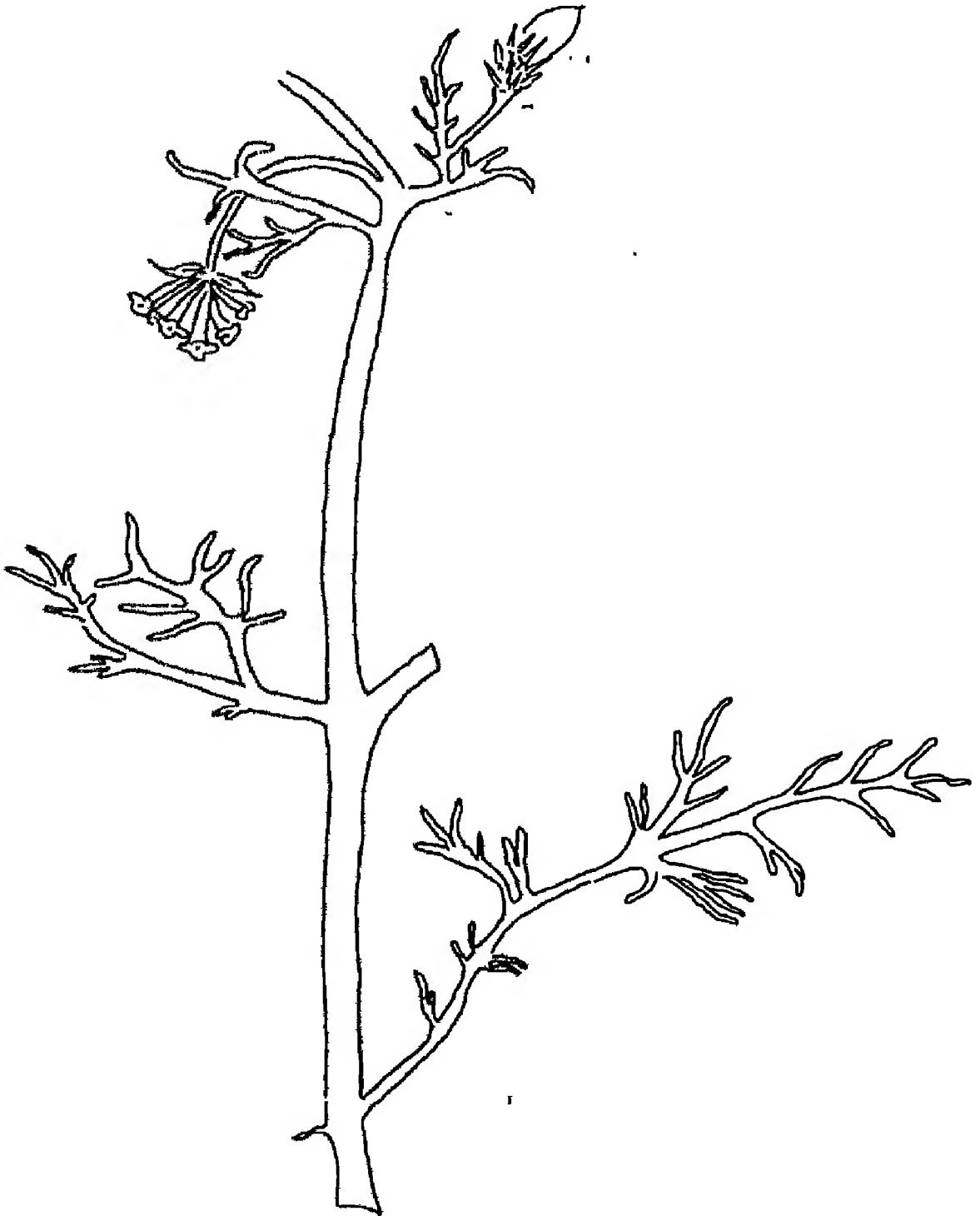


Fig. 89 Verbena sp.

BIGNONIACEAE

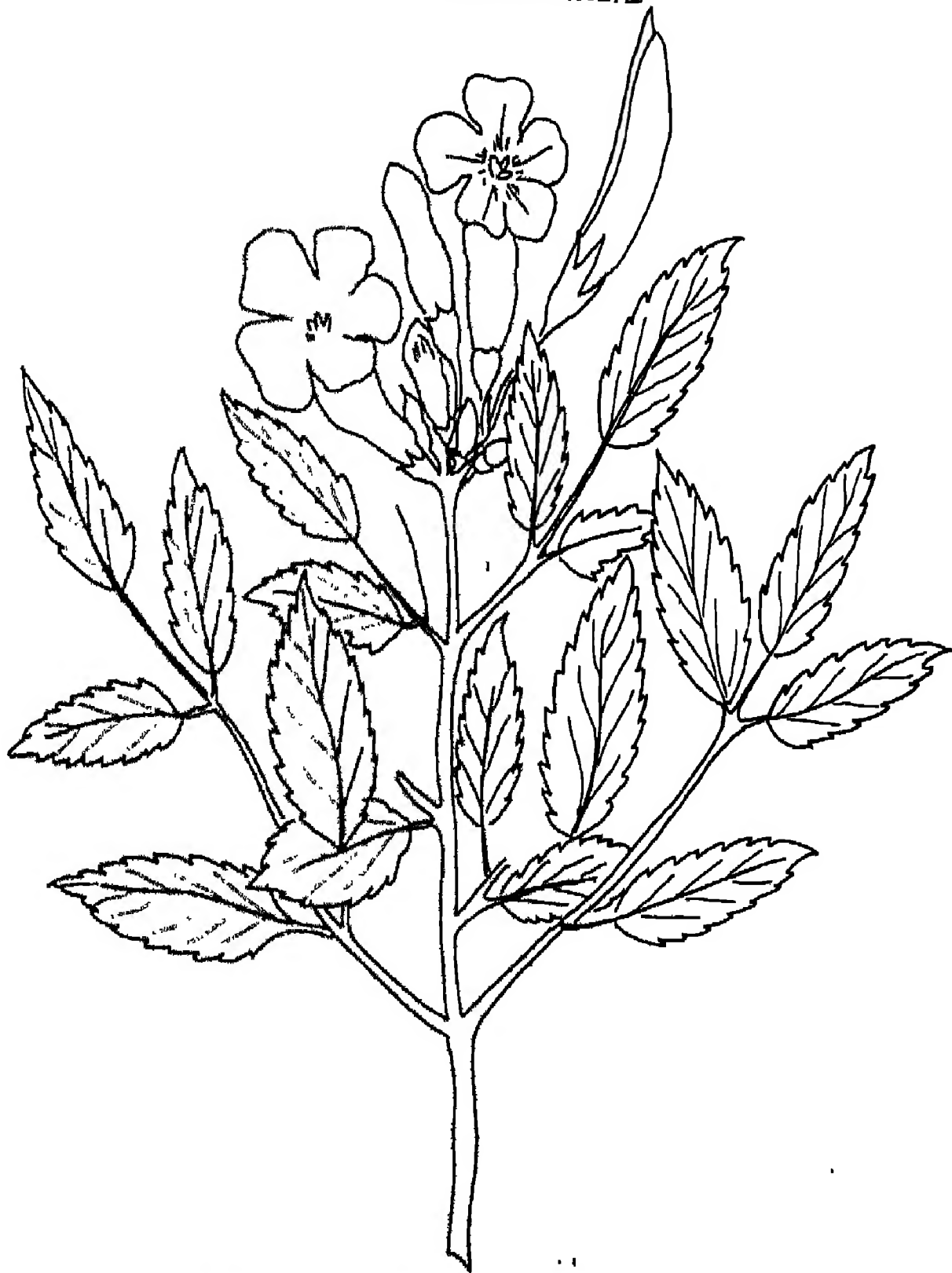


Fig. 90 Tecoma stans (L.) H.B. & K.

LADIATEAE

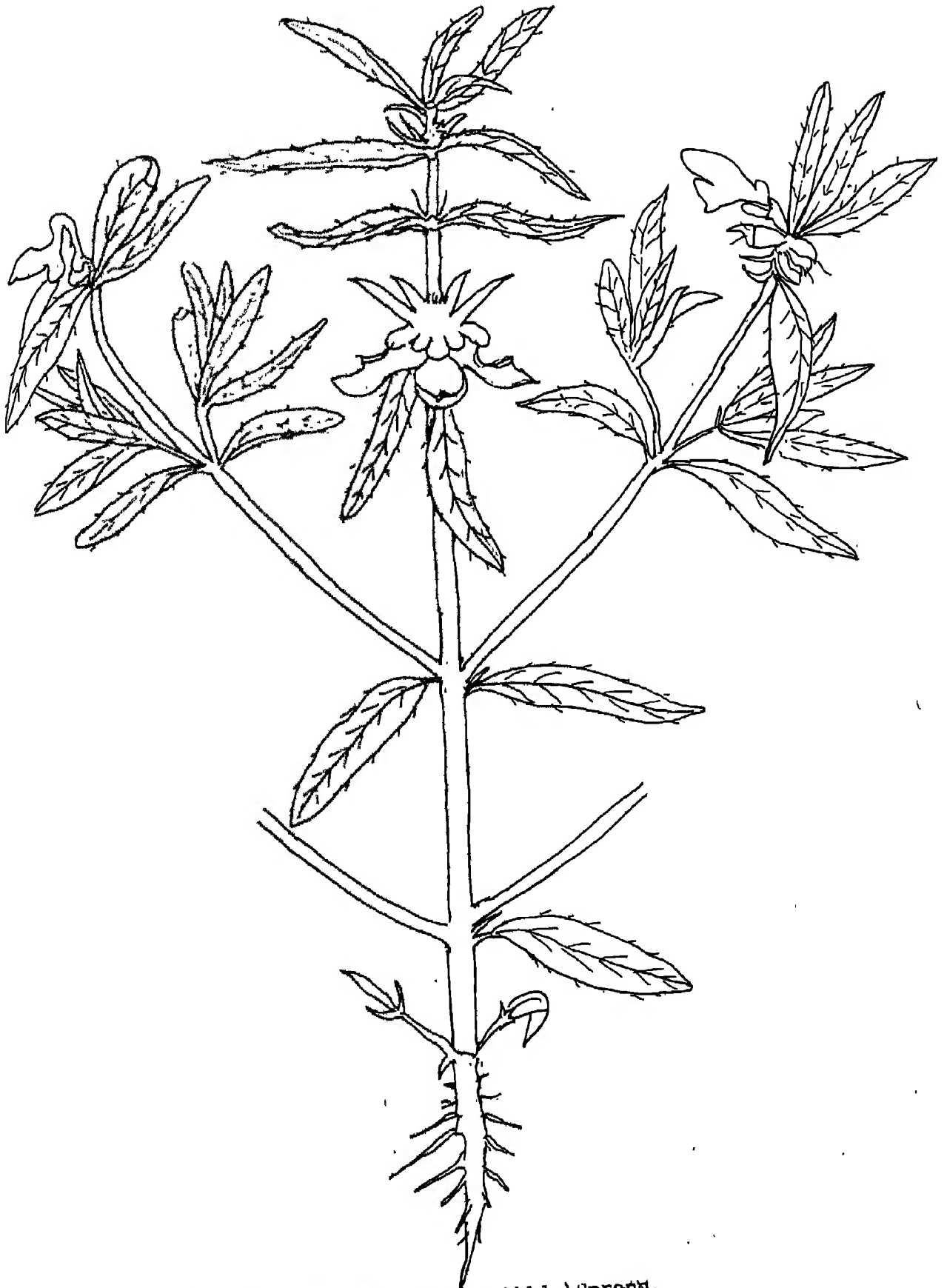


Fig 91. Laucas aspera (Willd.) Spreng.

' NYCTAGINACEAE



Fig.92 Boerhavia diffusa L.

NYCTAGINACEAE

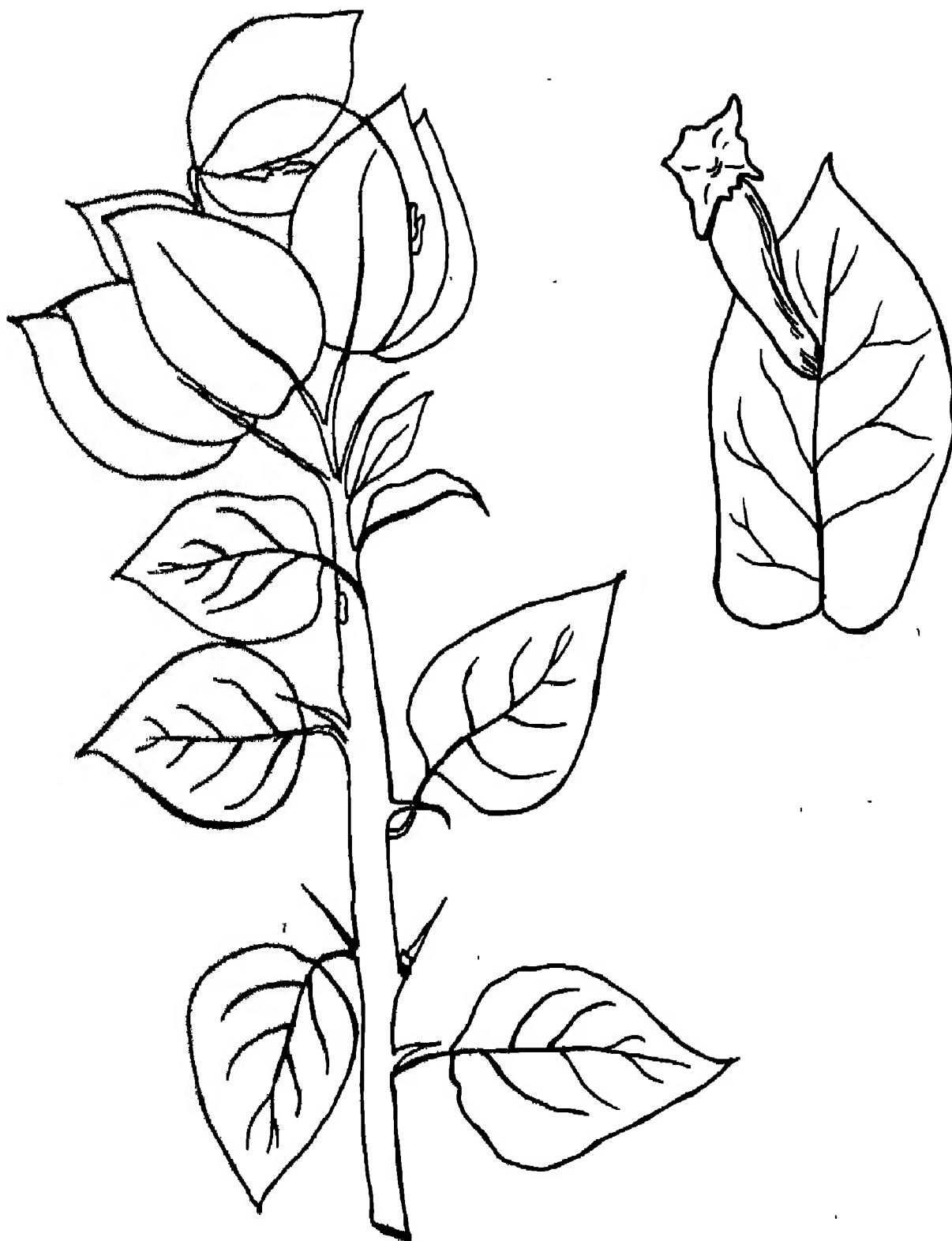


Fig. 93 Bougainvillea glabra choisy.

NYCTAGINACEAE



Fig. 94 Mirabilis jalapa L.

AMARANTHACEAE

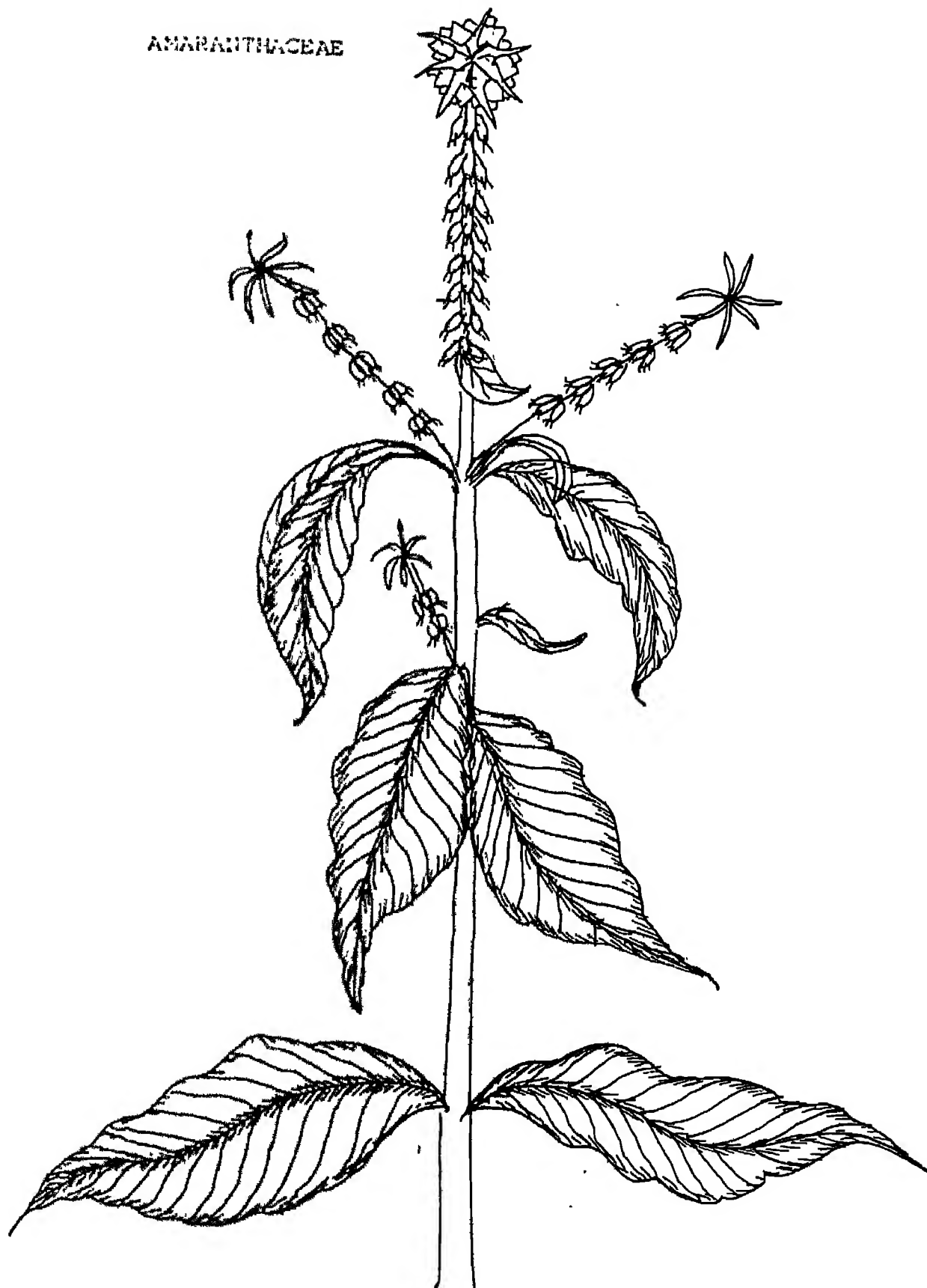


Fig. 95 Achyranthes aspera L.

AMARANTHACEAE



Fig. 96 Amaranthus tricolor L.

POLYGONACEAE



Fig. 97 Polygonum glabrum Willd.

LORANTHACEAE

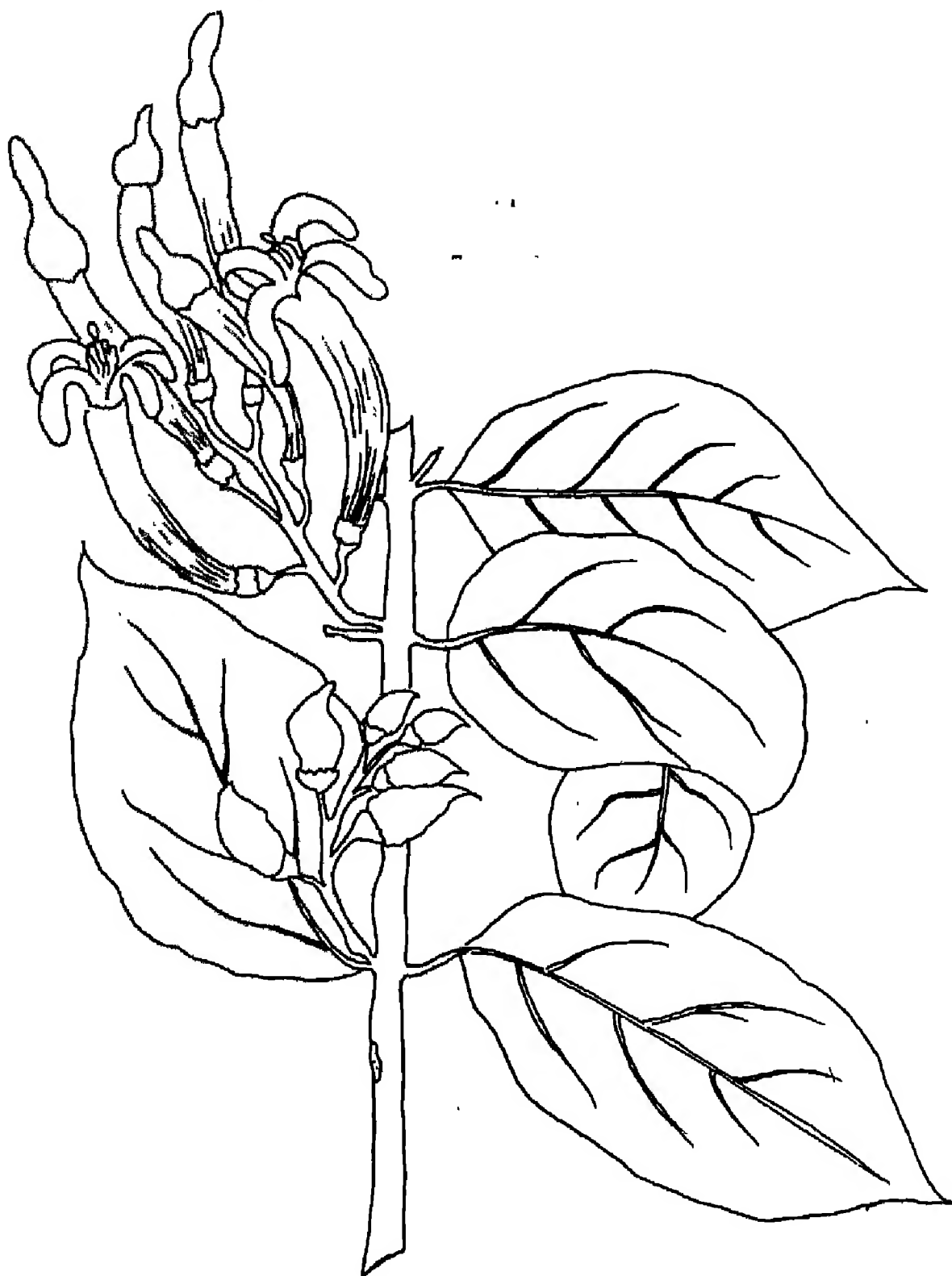


Fig. 98 Dendrophthoe falcata (L.F.) Ettings.

EUPHORBIACEAE

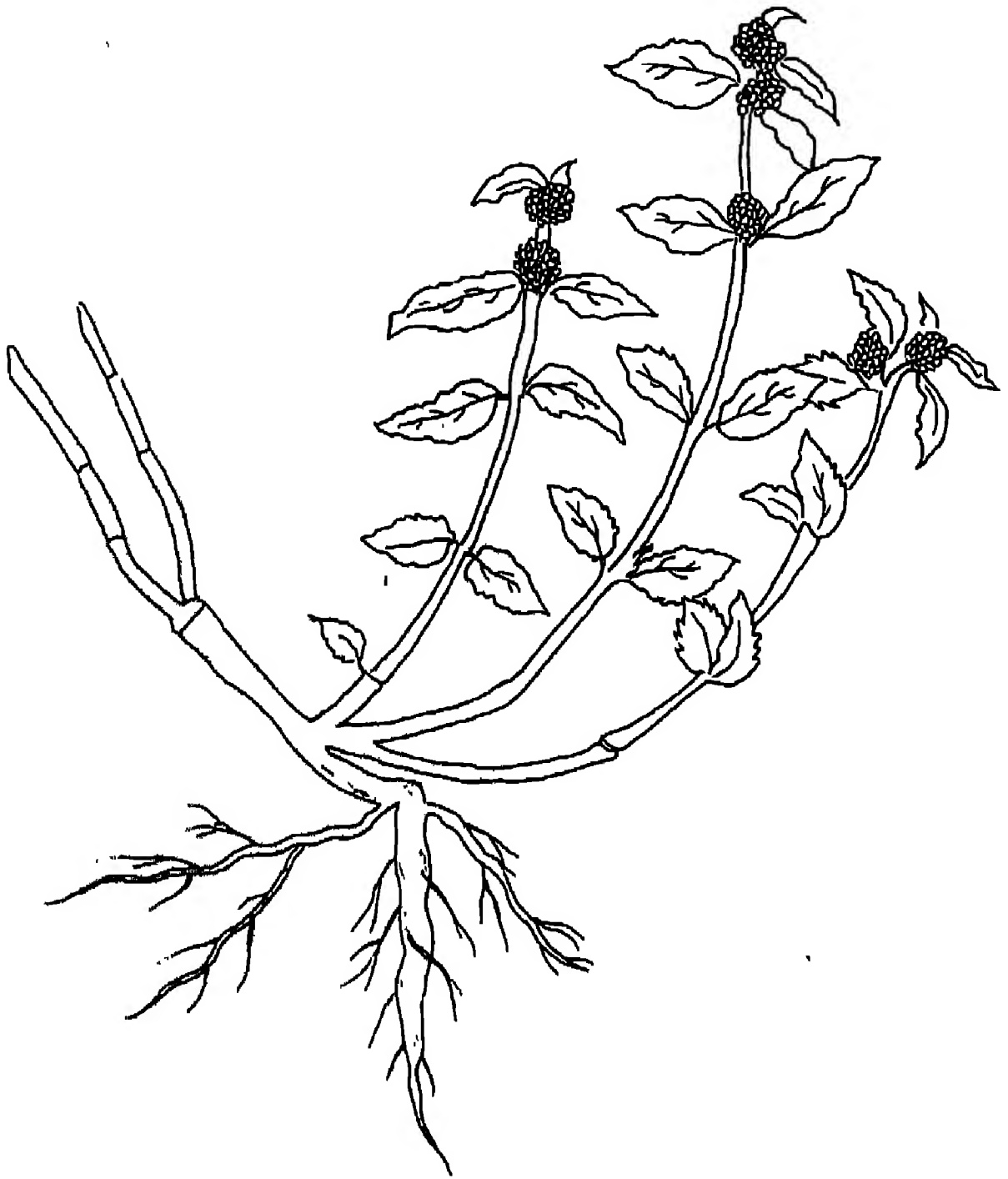


Fig. 99 Euphorbia hirta L.

EUPHORBIACEAE

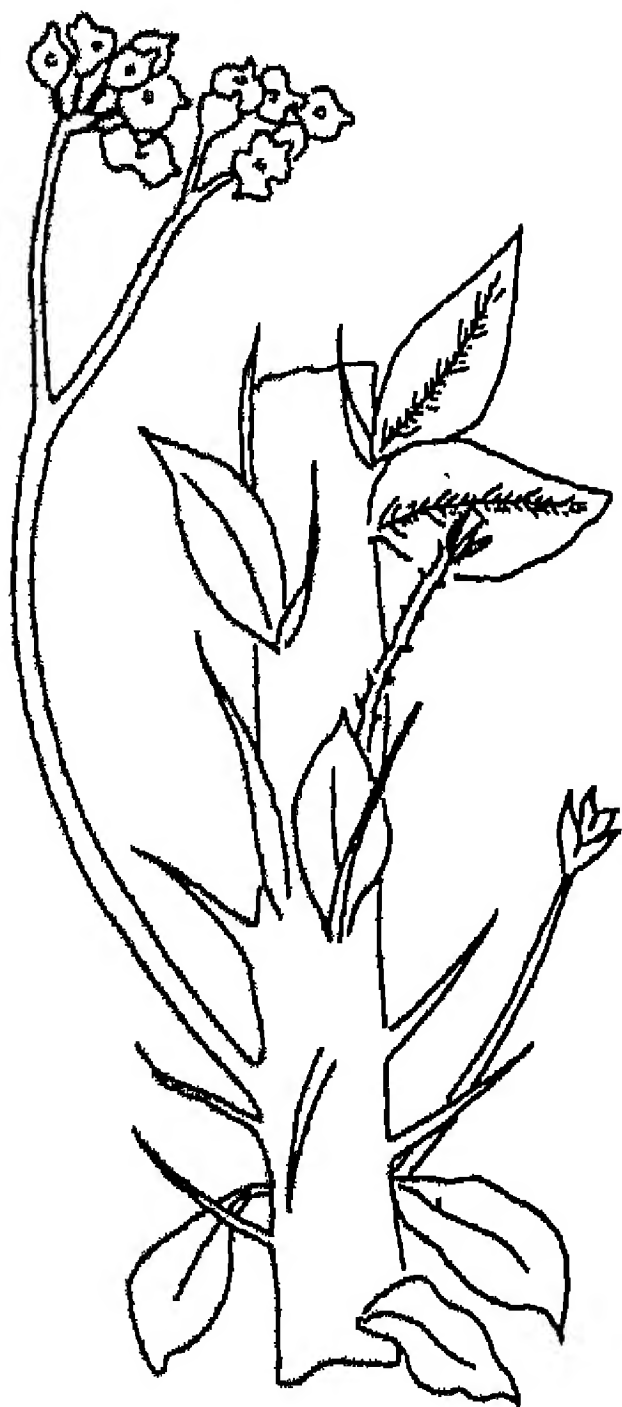


Fig. 100 Euphorbia milli. Ch-des-Moulins.

EUPHORBIACEAE

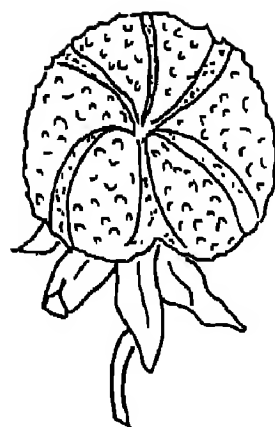
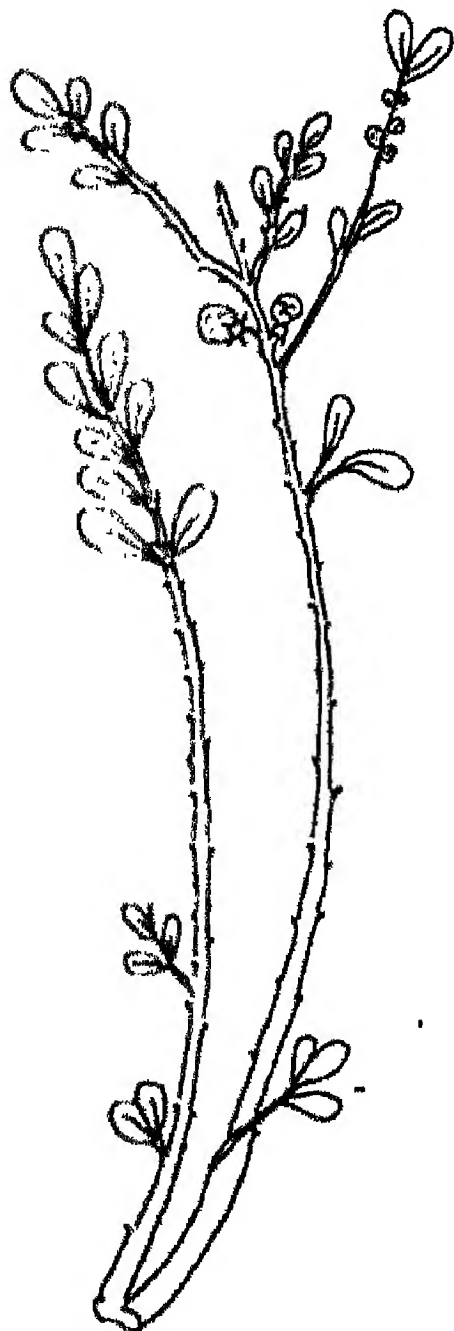


Fig. 171 Phyllanthus Sp.

EUPHORBACEAE

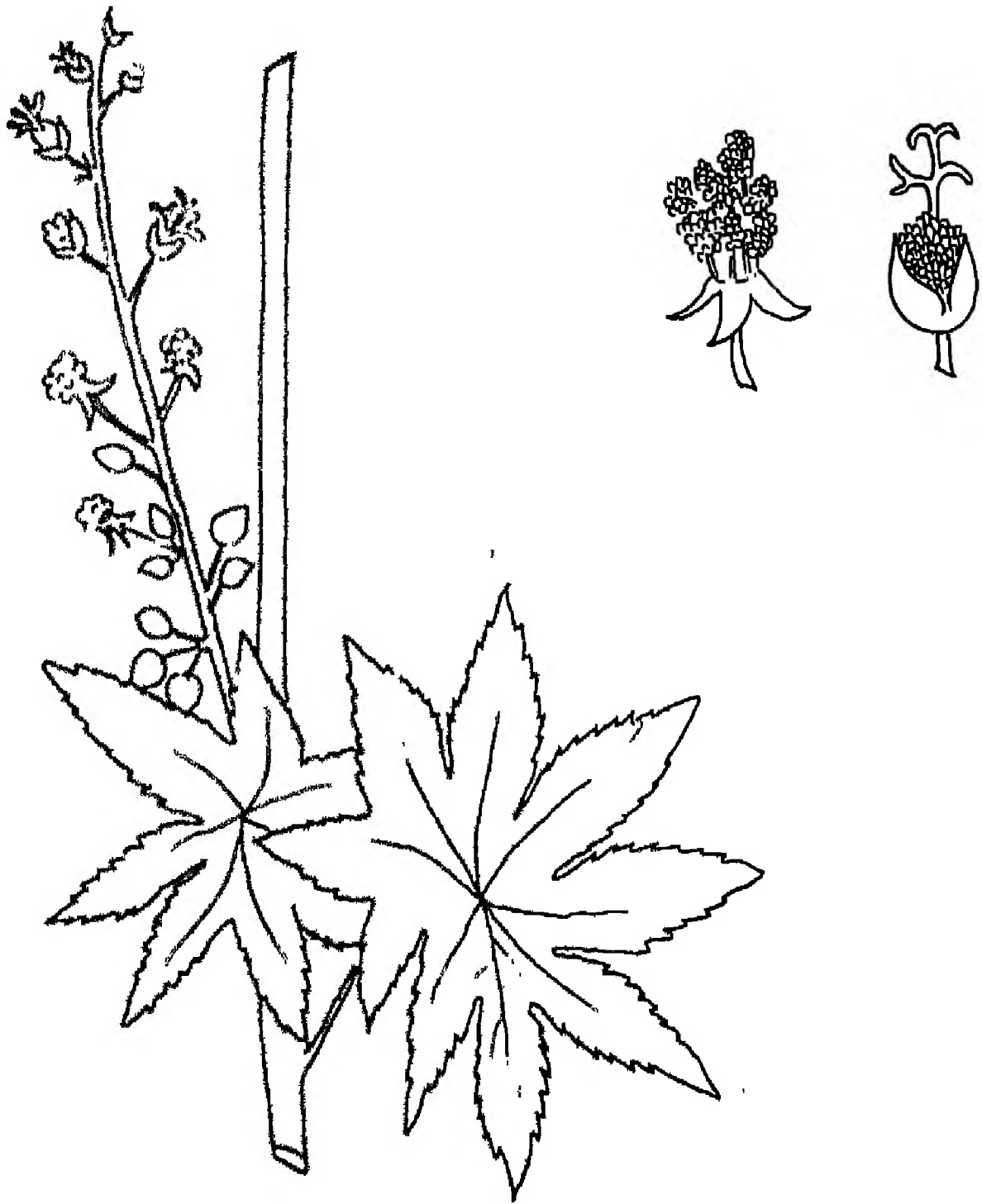


Fig. 102 Ricinus communis L.

MORACEAE

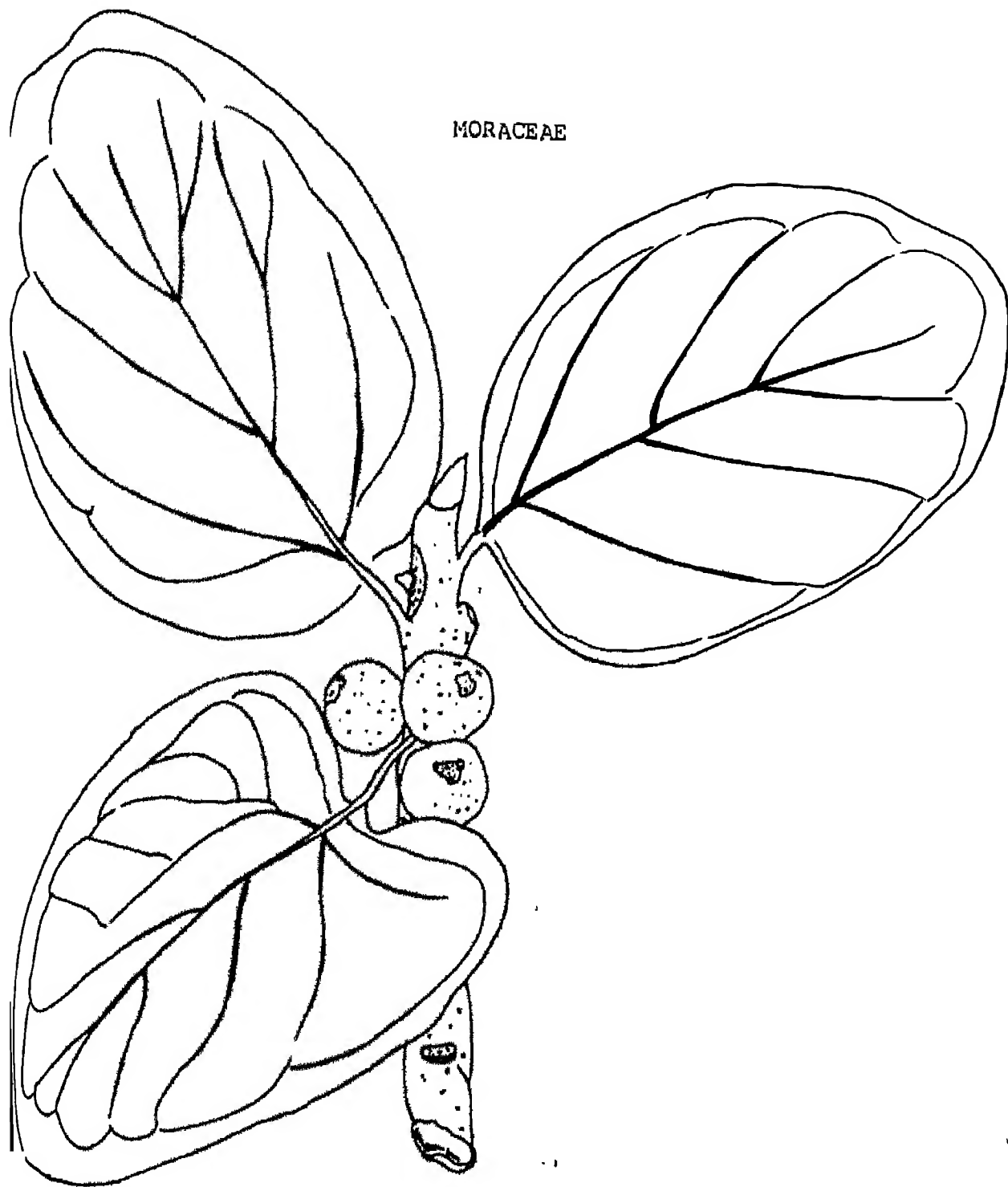


Fig 103 Ficus benghalensis L.

MORACEAE

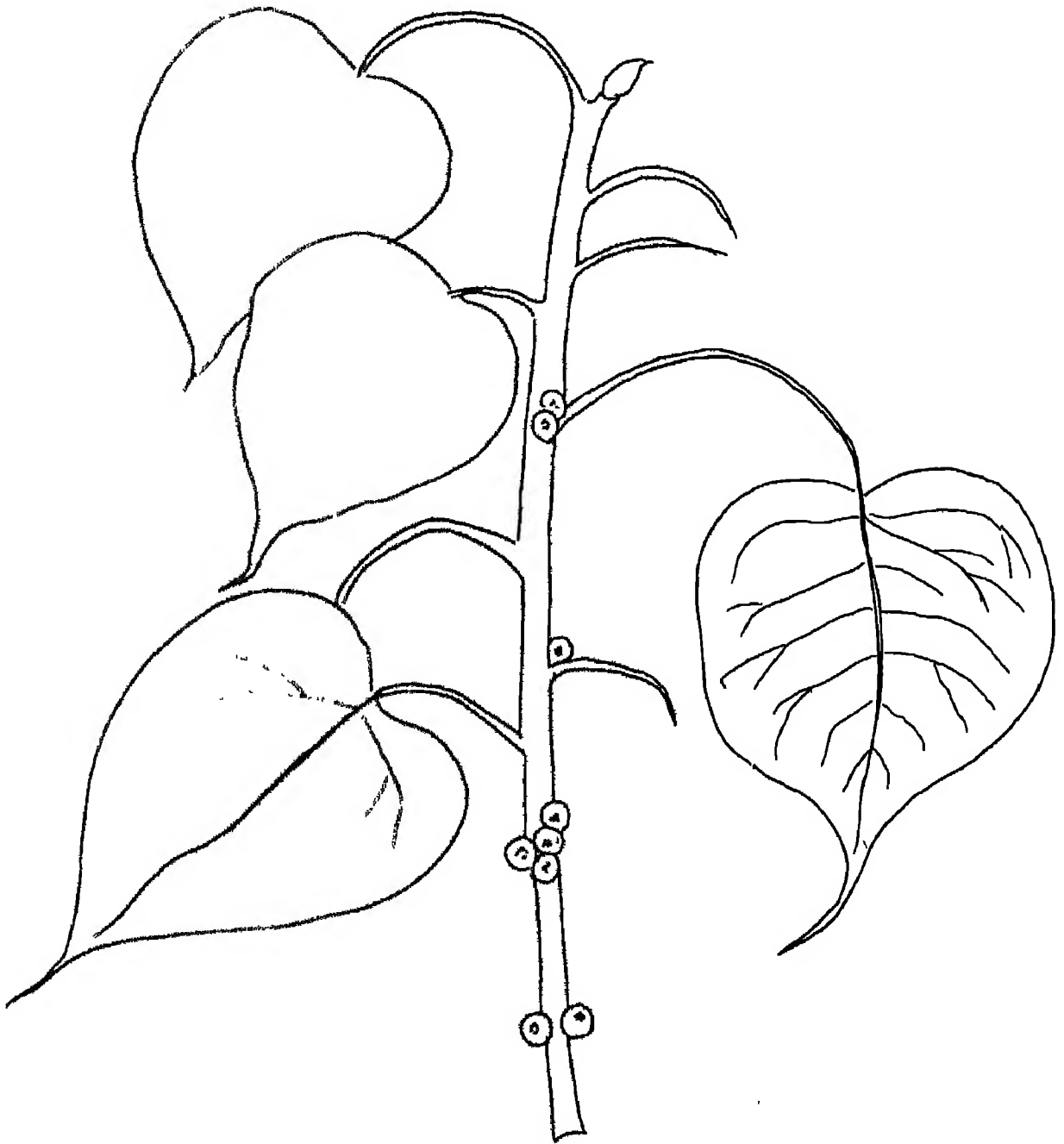


Fig. 104 Ficus religiosa L.

MORACEAE

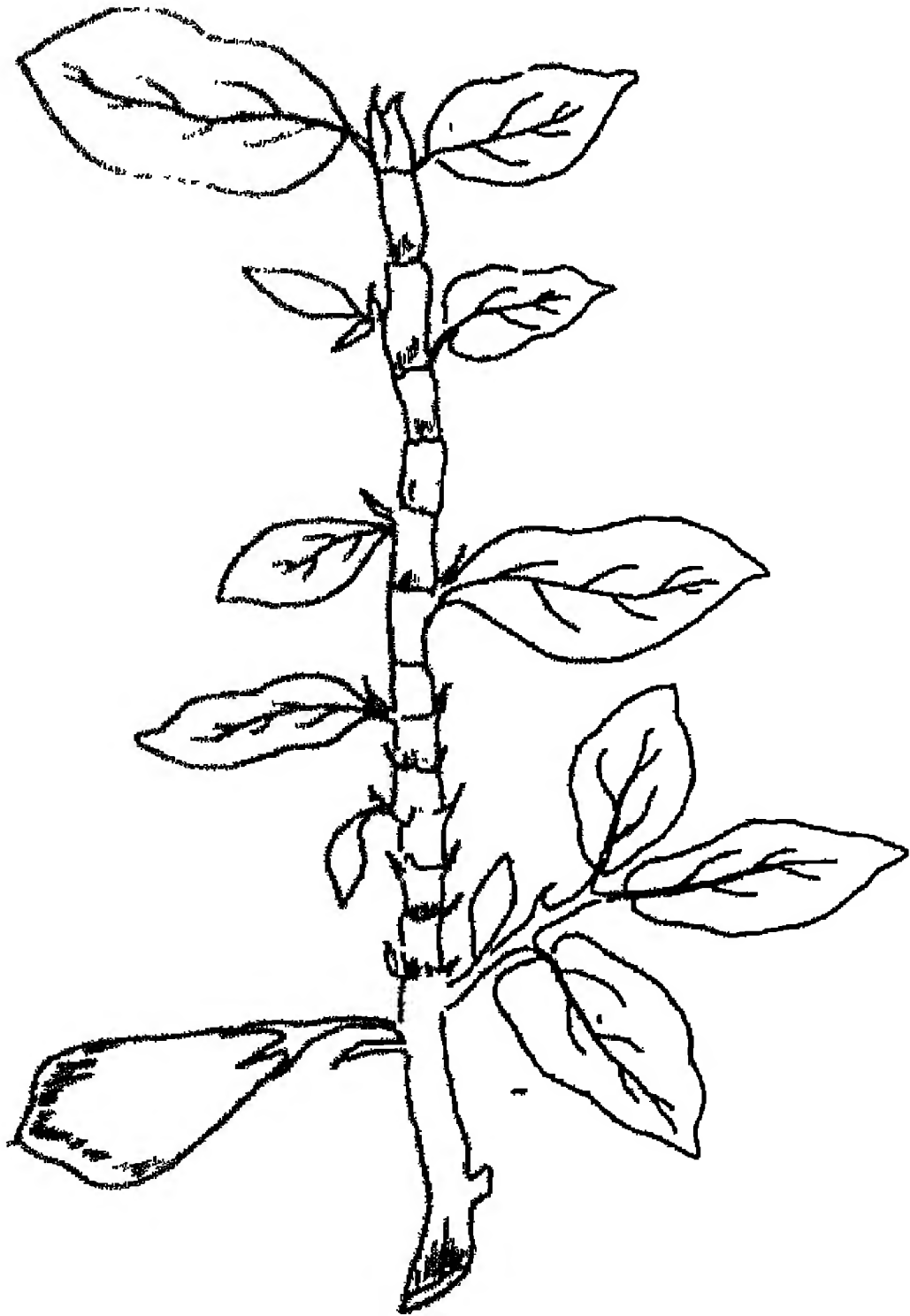


Fig. 105 Ficus repens willd.

MORACEAE

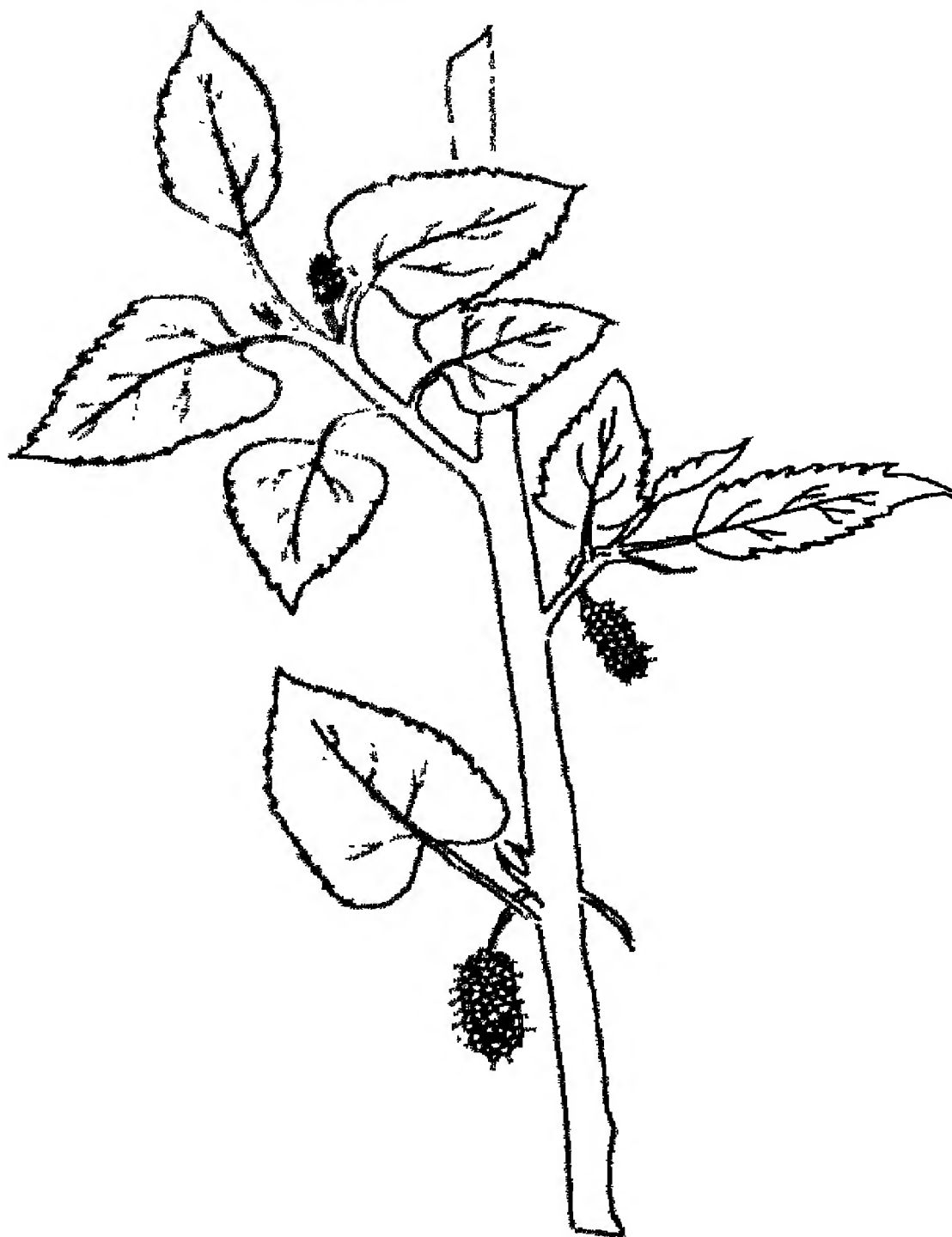


Fig. 106. Morus alba L.

CASUARINACEAE

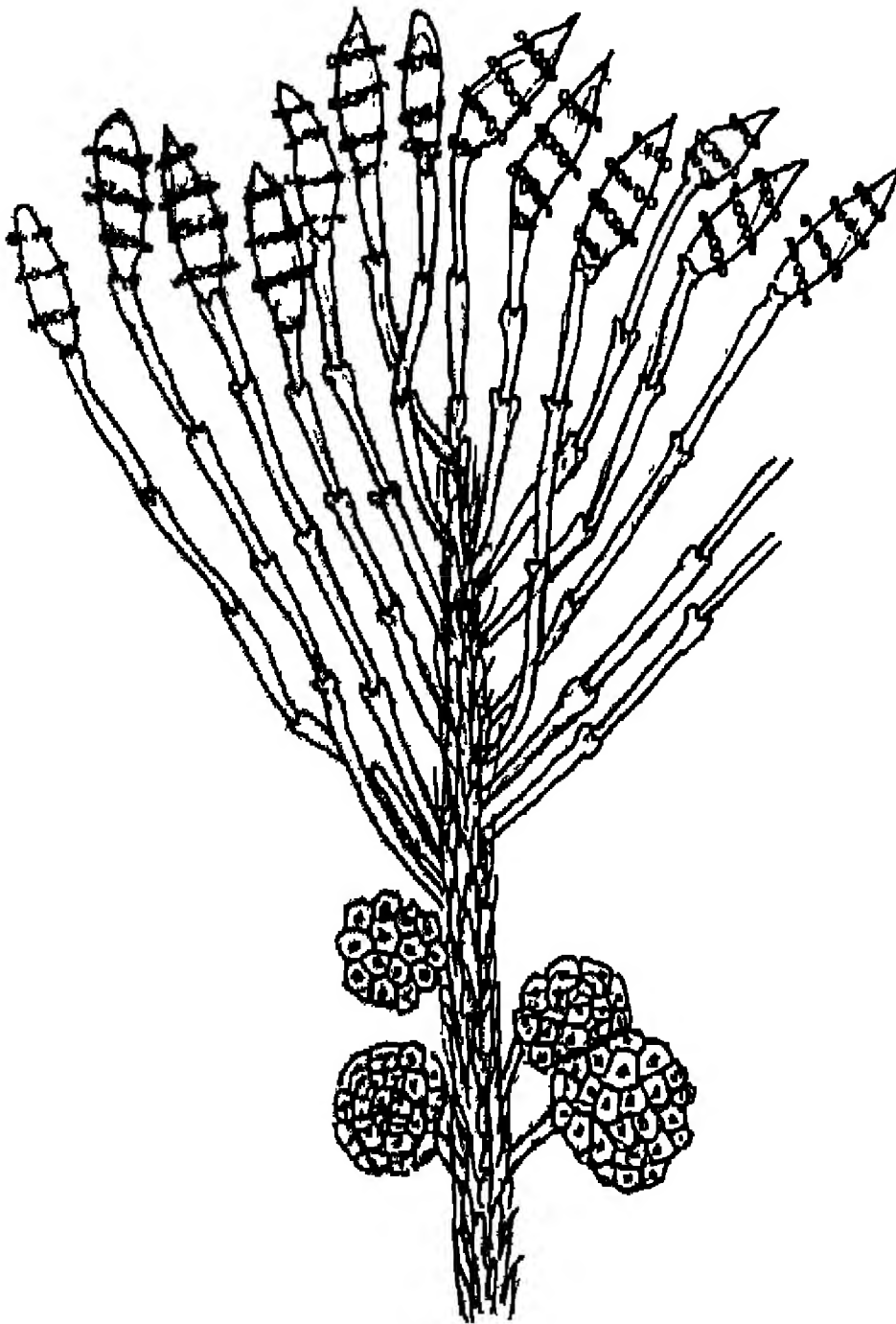


Fig. 107 Casuarina equisetifolia L.

CERATOPHYLLACEAE

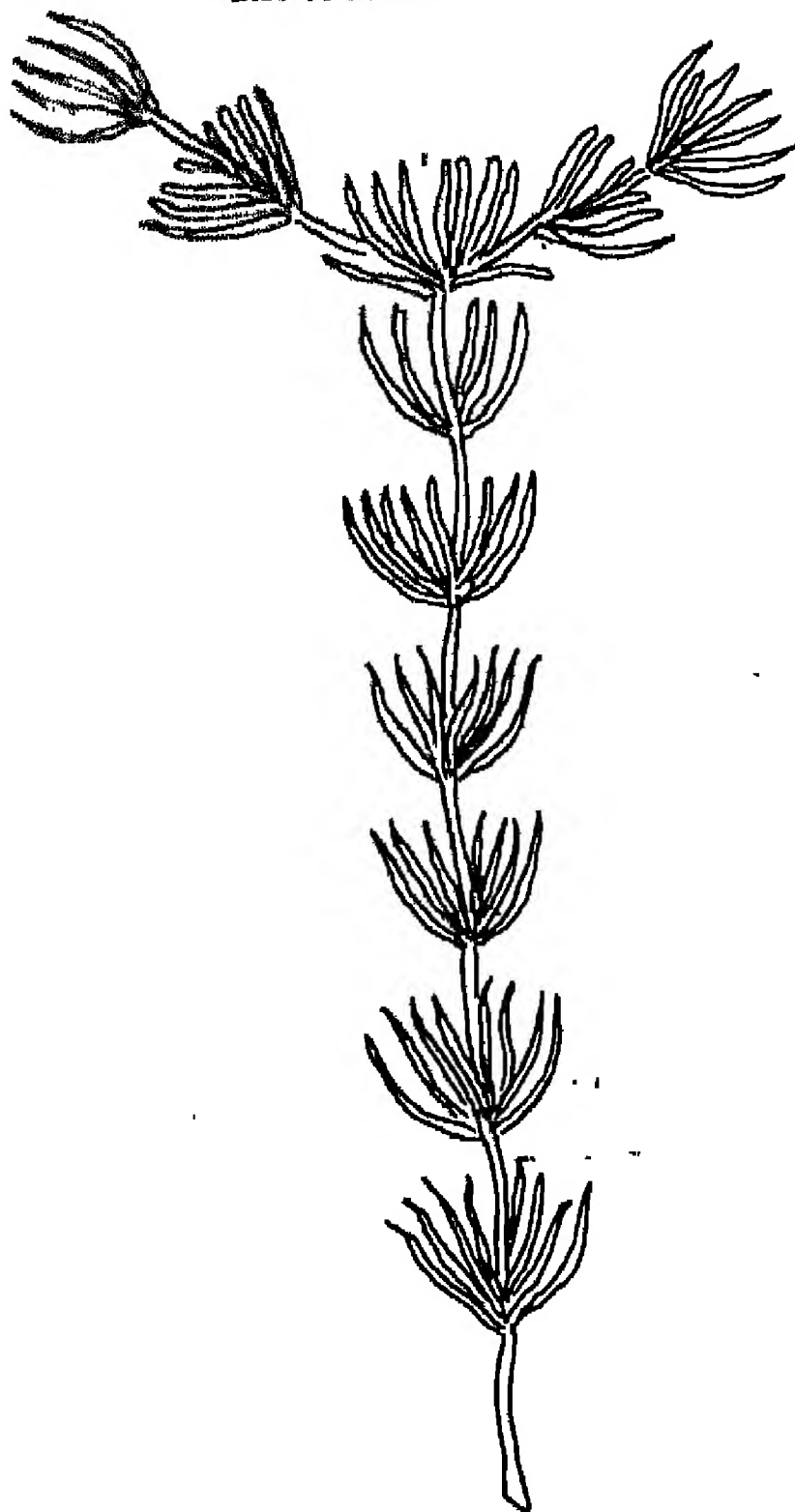


Fig. 108. Ceratophyllum demersum L.

AMARYLLIDACEAE

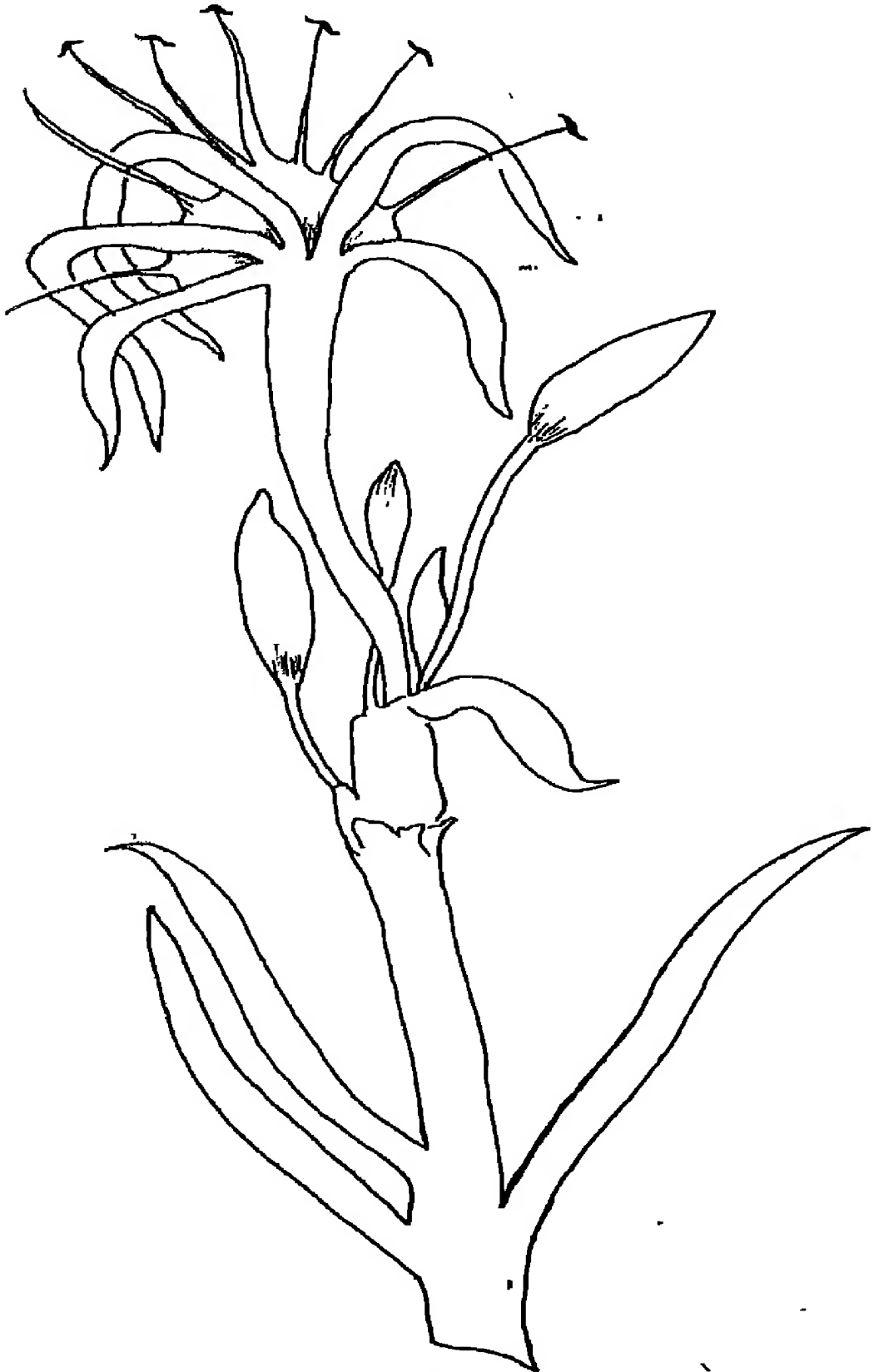
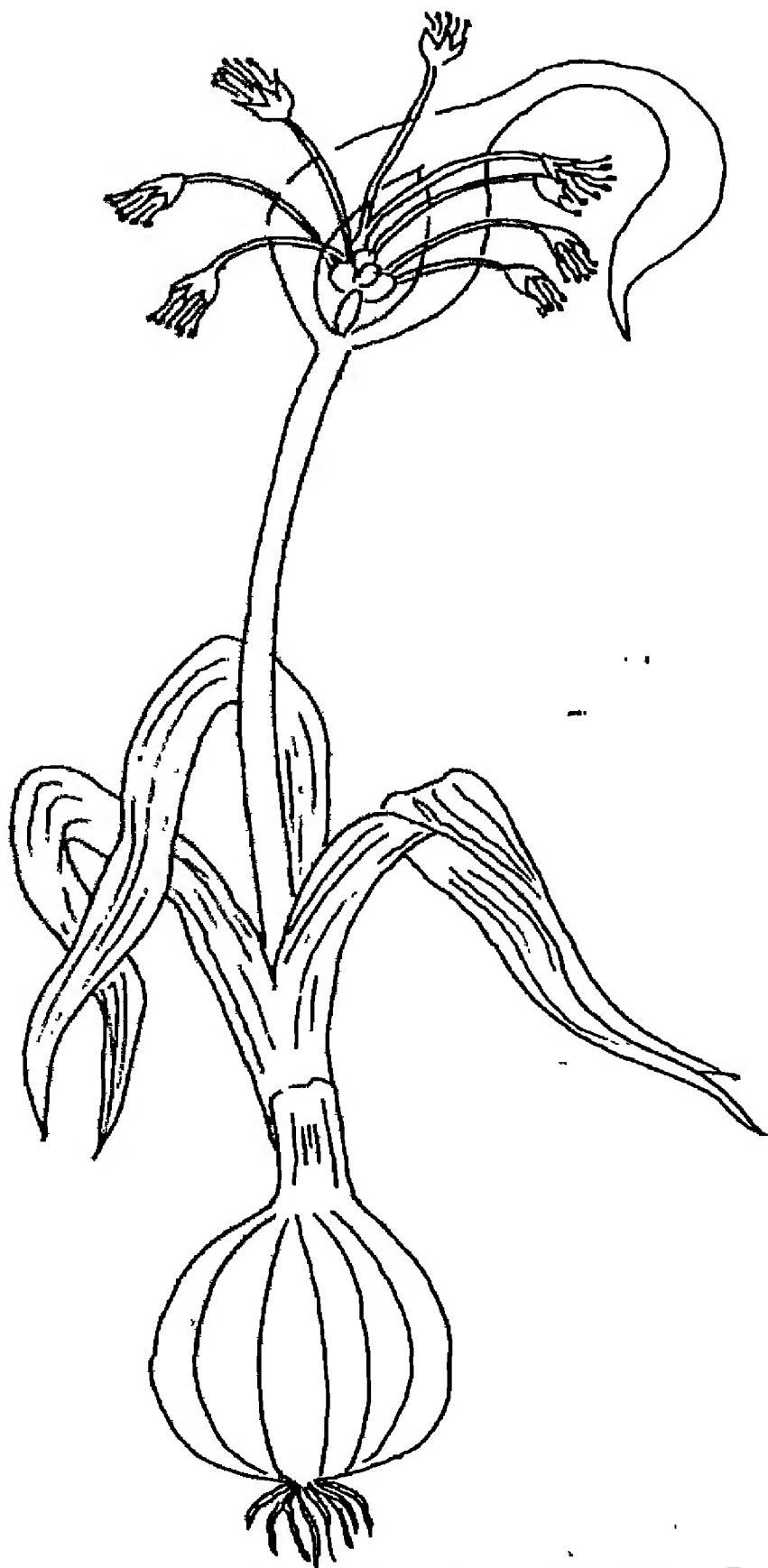


Fig 109. Crinum spp.



LILIACEAE

Fig. 110 Allium sativum L.

LILIACEAE

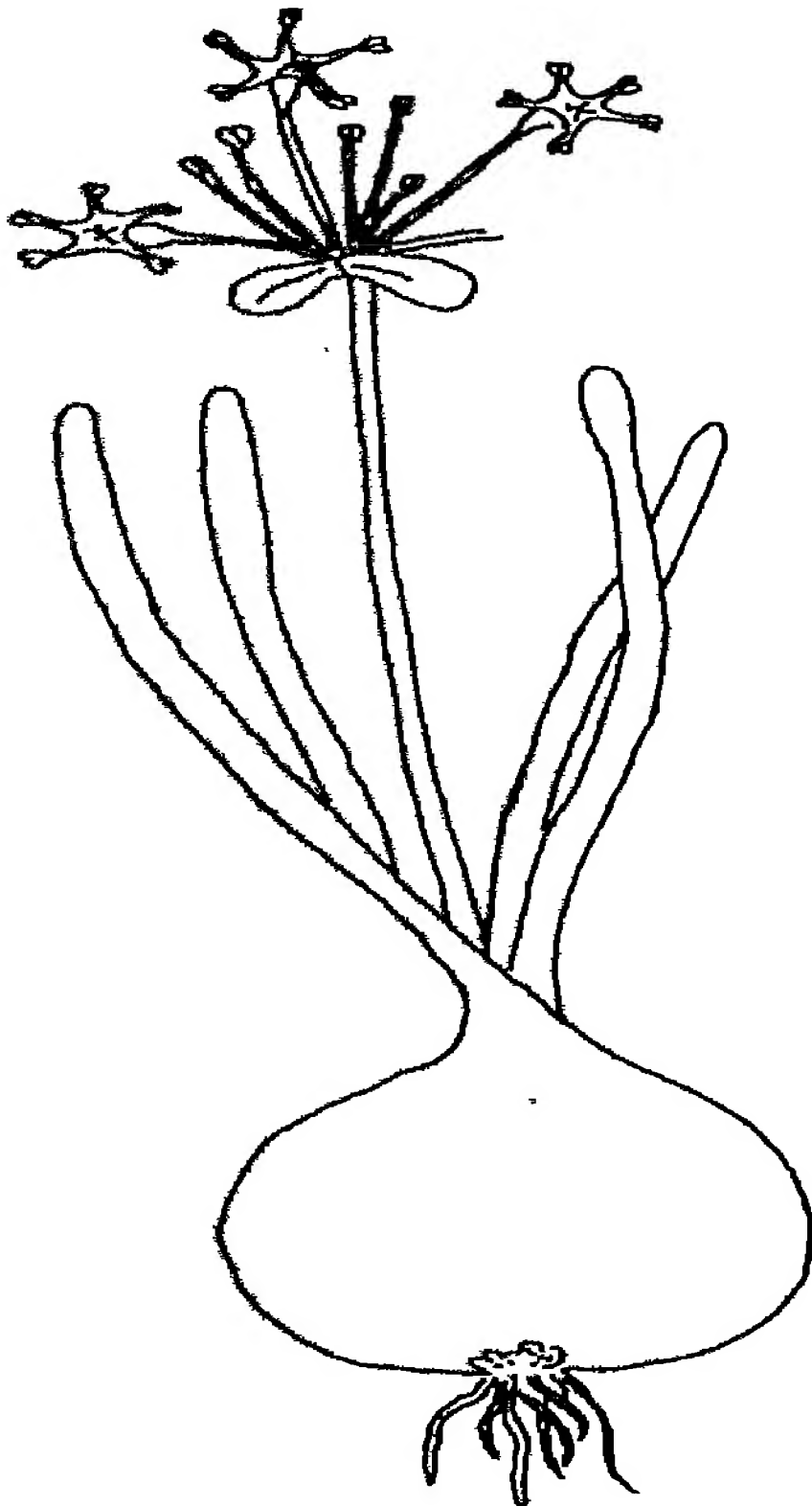


Fig. 111 Allium cepa L.

COMMELINACEAE



Fig. 112 Commelina benghalensis L.

COMMELINACEAE

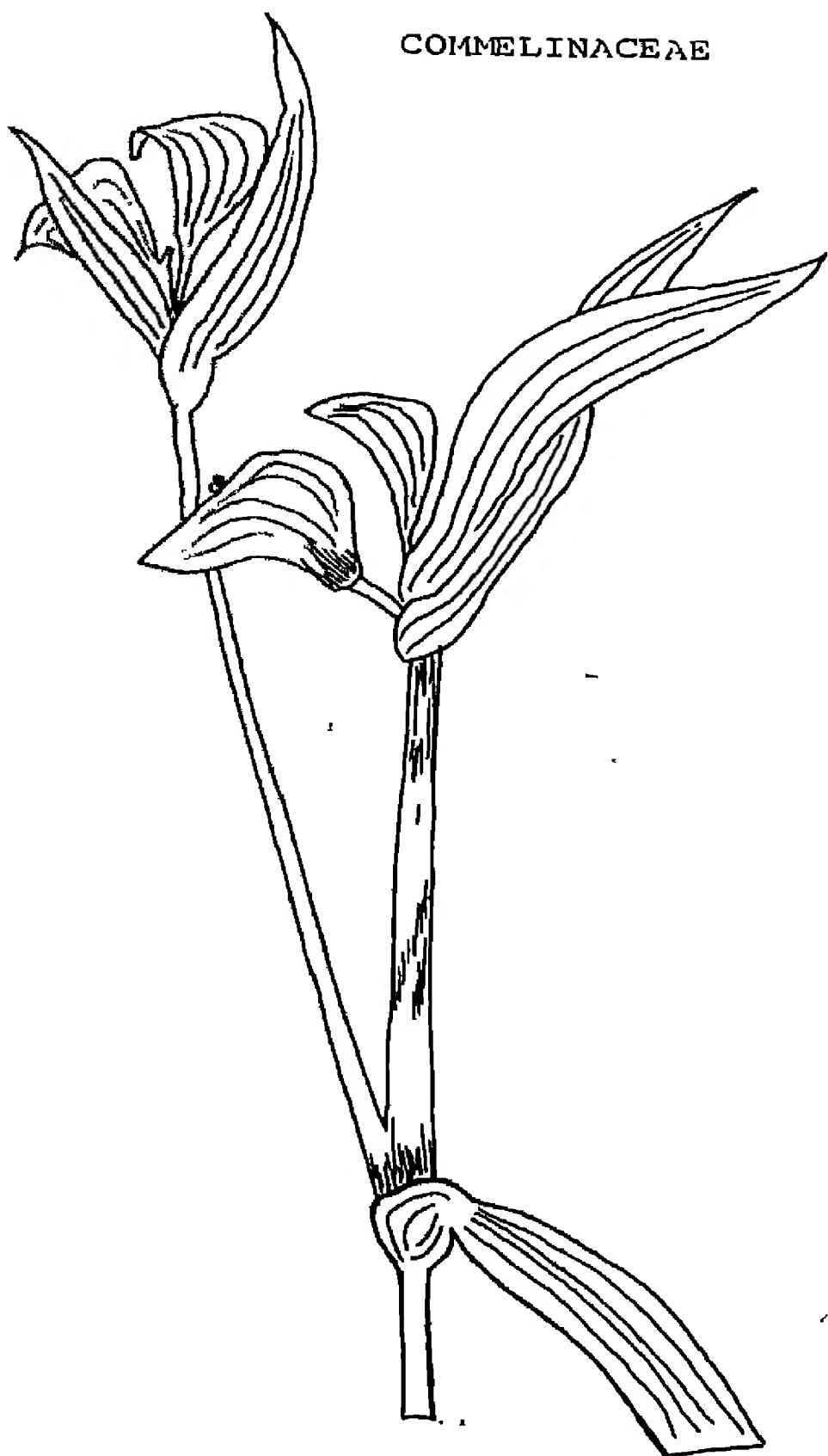


Fig. 113 Commelina forskalii vahl.

ARACEAE



Fig. 114 Colocasia sp.

1
ARACEAE

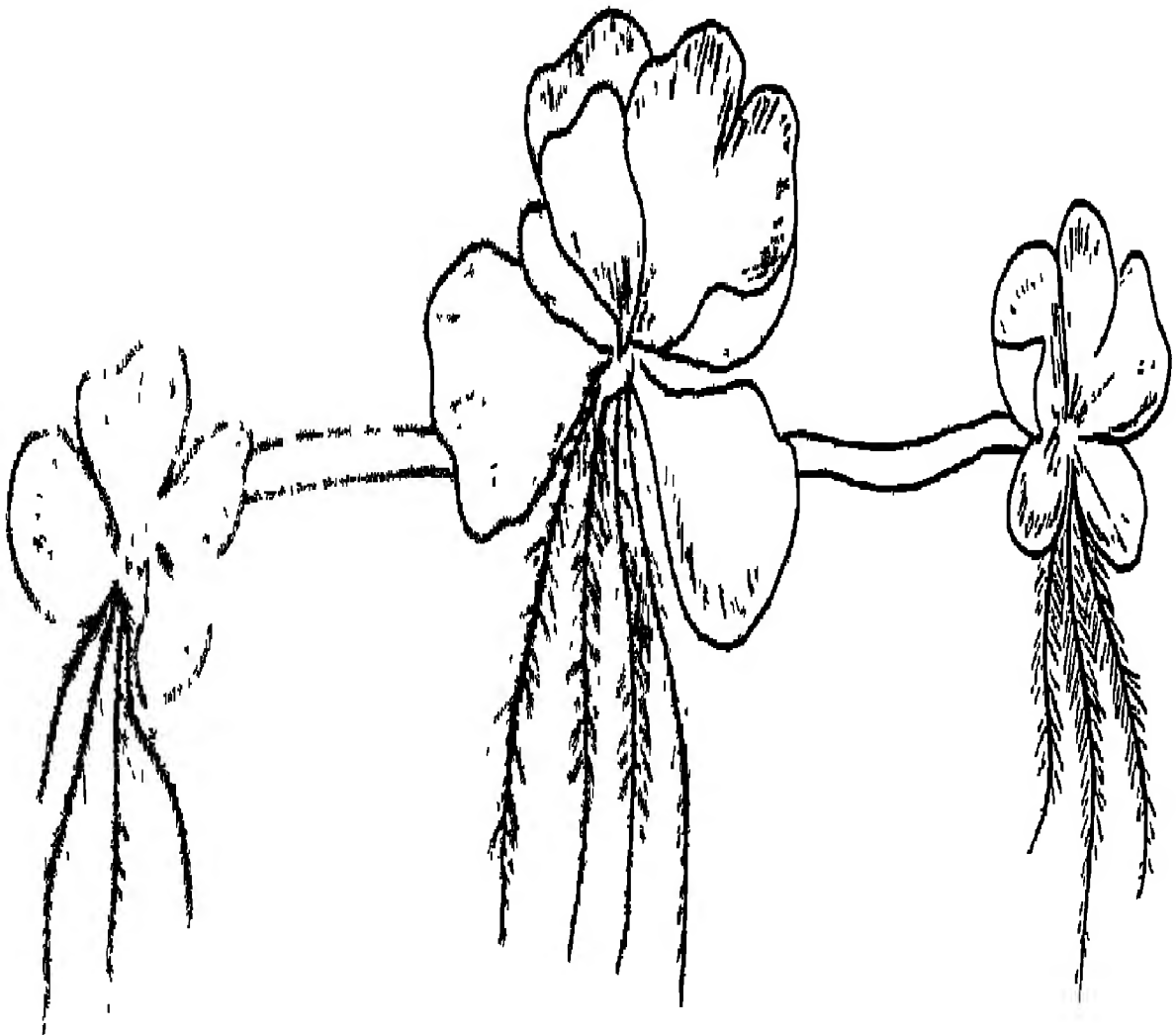


Fig. 115 Pistia stratiotes L.

POTAMOGETONACEAE



Fig. 116 Potamogeton indicus Roxb.

CYPERACEAE



Fig. 117 Cyperus alopecuroides Rottb.

CYPERACEAE



Fig. 118 Cyperus triceps (Rottb.) Endl.

GRAMINEAE



Fig. 119 Avena sativa L.

GRAMINEAE



Fig. 120 Chloris dolichostachya Lagasca.

GRAMINEAE



Fig. 121 Cynodon dactylon (L.) Pers.

GRAMINEAE



Fig. 122 Setaria glauca (L.) Beauv.

GRAMINEAE



Fig. 123 Triticum aestivum L.